

QA:N/A



THE JOE CROWLEY STUDENT UNION - FIRST GREEN BUILDING AT THE UNIVERSITY OF NEVADA, RENO



## ENVIRONMENTAL HEALTH AND SAFETY UNIVERSITY OF NEVADA, RENO

### 2006 ANNUAL REPORT

“SUPPORT AND OVERSIGHT FOR A SUSTAINABLE UNIVERSITY”

## Table of Contents

Message from the Director.....	i
Executive Summary.....	ii
Environmental Health & Safety Program Areas.....	iv
Acknowledgements.....	v
About the Cover.....	vi
 EH&S Annual Report .....	 1
Introduction and Overview.....	2
Cost of Providing EH&S Services .....	2
EH&S Information Systems .....	4
 A. EH&S Section Activity Reports.....	 A-1
1. Laboratory/Biosafety .....	A-2
2. Hazardous Waste Management.....	A-16
3. Radiation Safety.....	A-20
4. Occupational Safety .....	A-25
5. Emergency Planning .....	A-28
6. Environmental Affairs .....	A-31
7. Air Quality/Ventilation .....	A-34
8. Safety Training .....	A-38
9. Knowledge Management .....	A-42
10. Administrative Support and Incident Reports.....	A-47
 B. Environmental Data Report.....	 B-1
1. Hazardous Waste .....	B-2
2. Recycling Activities.....	B-4
3. Asbestos .....	B-7
4. Gamma Radiation Background.....	B-8
5. Wastewater Monitoring .....	B-9
6. Air Quality .....	B-11
 Appendices.....	 App.-0
App. 1 EH&S Organization Chart.....	App.1-1
App. 2 Safety Committees Organization Chart.....	App.2-1
App. 3 Special Projects .....	App.3-1
VOC Emission Monitoring and Performance Improvement.....	App.3-1
Exposure Reduction Projects.....	App.3-3
Irradiator Relocation and Security System Upgrade .....	App.3-4
Inventory at Central Receiving.....	App.3-4
App. 4 Staff Data.....	App.4-1
Publications .....	App.4-1
Presentations and Reviews .....	App.4-1
UNR Lectures.....	App.4-3

Grants Awarded and Pending.....	App.4-3
Professional Awards.....	App.4-3
Certifications and Licenses Obtained and Maintained.....	App.4-3
Continuing Education.....	App.4-4
UNR Governance Committee Assignments.....	App.4-5
Professional/Public Service.....	App.4-7
Services to Other Institutes of NSHE.....	App.4-8
 App. 5 Current Permits and Licenses .....	 App.5-1

## Message from the Director

**March 15, 2007**

There were several challenges for the EH&S department this past year. The most visible was the regulatory requirement to calculate chemical air emissions from laboratory hoods. The laboratory chemical inventory program at UNR is one of the most comprehensive in the country; however, in the past, incomplete information about chemical purchases limited our ability to accurately calculate chemical air emissions. Multiple administrative changes were implemented in 2006 to remedy this shortcoming, including the establishment of a new EH&S program to document receipt of laboratory chemicals as they arrive at the Central Receiving facility. As a result of this new program, the quality of the air emission data was significantly improved in 2006, which greatly increased the regulators' confidence in our air emissions calculations and resulted in renewal of the campus laboratory fume hood air permit.

Rapid growth of the university is evident with increasing student enrollment, physical plant size, and research activities. The UNR program has adopted environmental management and sustainability concepts as guiding principles, both in environmental programs and more traditional safety programs. Implementation of these concepts will enable the university to continue growing in a manner that minimizes its impact on environmental resources while improving environmental health and safety performance, all in fiscally prudent manner. The most obvious example of this concept is the Joe Crowley Student Union building currently under construction. With strong support from the student body, this building was designed as a "green building" and is the first such building to be constructed on the UNR campus.

Lastly, a change in the leadership of the EH&S department occurred in 2006 as Dr. Steven Oberg retired as the EH&S Director in November. During Dr. Oberg's eleven year tenure, UNR health and safety programs evolved from an incomplete collection of programs reporting through multiple administrative units, into the comprehensive, nationally recognized program displayed in this report. Although Dr. Oberg's contributions to the university were significant, many have not yet been fully recognized and may require future reflection to be entirely appreciated. We wish Dr. Oberg the best in all his future activities.

We hope that you will find this report to be a useful reference. If you would like more information on any topic found in this report, please contact me or any other EH&S staff member at 327-5041.

Ben Owens  
Interim Director of EH&S



## Executive Summary

This report documents the major activities of the Environmental Health and Safety (EH&S) Department for the year 2006. Activities for each of the EH&S program areas are detailed in Section A, while activities that monitor or otherwise affect operations with potential to impact environmental health are described in Section B.

This report contains a number of indices that have been developed by section leaders to track performance of EH&S functions. The following are some key performance indices and activities culled from this report. The indices and activities listed are a limited subset and are not meant to provide a full summary of EH&S activities in 2006; however, they do provide some sense of the scope and effort. The rest of the report provides context and additional information for these indices and activities, which we believe, demonstrate reduction of health, safety, and environmental risks.

### Laboratory Safety

- 262 persons attended laboratory safety training
- 172 persons attended laboratory Bloodborne Pathogens training
- 138 laboratory safety assessments conducted involving 451 rooms
- 21 biological agent use protocols coordinated and reviewed
- Provided technical support to Laboratory Safety Committee - 2 new policies developed; 5 policies approved

### Chemical Inventory

- 79,591 chemical containers inventoried
- 3,282 chemical containers received as part of new chemical receiving program (partial year, 8/21/06 – 12/31/06)
- 1,069 chemical entries included in campus laboratory fume hood air emissions report
- 125 chemical storage issues identified and resolved

### Hazardous Waste Management

- 98,400 pounds of chemical waste shipped offsite for disposal
- 5,950 chemical waste containers picked up from campus workplaces
- 1,890 workplace visits to pickup waste or deliver waste accumulation containers
- 26 chemical spill responses
- 7 lab visits per day (on average)

### Radiation Safety

- 2,692 pounds of radioactive waste shipped offsite for disposal
- 599 radiation/contamination surveys conducted
- 299 radioactive material packages received
- 244 persons attended radiation/laser safety training
- 52 laser hazard analyses conducted

### Occupational Safety

- 119 inspections and audits conducted
- 182 safety deficiencies noted
- 30 respiratory fit tests performed
- 28 respiratory protection training classes conducted

#### Emergency Planning

- 15 evacuation plans developed/revised
- 15 building emergency hazard assessments conducted
- 13 evacuation drills conducted involving 2,420 people
- 9 emergency planning workshops conducted involving 133 people
- Major contributor to development of campus pandemic flu plan

#### Environmental Affairs

- 27,725 pounds of recyclable materials collected
- \$30,000 grant for campus recycling program
- 16 sewer discharge permits maintained
- 3 campus air permits maintained
- Significant contributor to annual laboratory fume hood air emissions report

#### Air Quality/Ventilation

- 984 direct reading air quality measurements
- 771 local exhaust hood surveys
- 106 air quality incidents
- 60 integrated air quality samples
- 3 major air monitoring projects that resulted in improved air quality for building occupants

#### Safety Training

- 1,650 persons who attended EH&S training
- 179 safety training classes presented on 27 different topics
- 157 persons who attended new employee safety orientation
- 50% increase in EH&S Jim Randolph Memorial Scholarship
- 23.4% increase in video training materials (216 total training videos)

#### Knowledge Management

- 130 laboratory door cards produced
- 44% increased removal of air contaminants emitted from walk-in hood
- 17 monitoring events of chemical emissions from hazardous waste walk-in hood
- Compiled and formatted EH&S annual report

#### Administrative Support

- 176 incident reports received and tracked
- Maintained EH&S department budget information
- Maintained personnel records
- Provided administrative support for campus safety advisory committees

#### Information Technology

- Significant contributor to annual laboratory fume hood air emissions report
- IDMS update with new laboratory characterization data
- Improved GIS maps by integration of increased resolution photos

## Environmental Health and Safety Program Areas

(See Appendix App.1 for 2006 organizational chart.)

Professional support services provided by the Environmental Health and Safety program in 2006 were represented through the following disciplinary areas:

Laboratory/Biosafety	Environmental Affairs
Chemical Inventory	Air Quality/Ventilation
Hazardous Waste Management	Safety Training
Radiation Safety	Knowledge Management
Occupational Safety	Information Technology
Emergency Planning	Administrative Support

### Environmental Health and Safety Staff:

Luis Barthel-Rosa, Ph.D.	David Lee, CIH, CSP
Donna Brown	Andres Leon <sup>1,3</sup>
Ken Carney	Mary Macdonald
Cheston (Chet) Carpenter <sup>1</sup>	Steven Oberg <sup>1</sup> , Ph.D.
Bob Cullins, CEM	Ben Owens, CIH, CCHO
John Davis, MBA	John Sagebiel <sup>1</sup> , Ph.D., LEED
LeRai Frank	Joseph (Marty) Schwender
Matthew Free	Rich Stone, CIH, CSP
Chung-hwan Je <sup>2</sup> , Ph.D., P.E.	Gregg Tallman <sup>3</sup>
Myung Chul Jo, CHP, CLSO	Durwood (Woody) Wright
Paul (Mike) Kivistik, CCHO	

<sup>1</sup> Partial year

<sup>2</sup> EH&S staff but partial year as Information Technology staff assigned to EH&S

<sup>3</sup> IT staff assigned to EH&S

## Acknowledgements

Successful completion of tasks and projects described in the following report would have been impossible without the active participation and genuine contribution of student employees and graduate assistants. The following students are gratefully acknowledged for their services to the EH&S program in 2006.

Student	Support Area
John Bernardy	Hazardous waste management
Matthew Rafferty	Hazardous waste management
Brendan Schnieder	Hazardous waste management
Brock Young *	Hazardous waste management
Joshua Orolfo +	Air quality/ventilation
Snidhar Tera +	Air quality/ventilation
Korrie Vance +	Air quality/ventilation
Alyssa Hobbs +	Training
Claire Roberts +	Training
Daniel Anderson +	IT support
Stephen Levitt	IT support
Nathan Penrod	IT support
Tabitha Maher *	Environmental affairs
Lauren Armijo +	Chemical inventory
Christian Peralta +	Chemical inventory
Omid Shamim +	Chemical inventory
Syam Challa *	Radiation safety
Aaron Balen +	Recycling
James Gleich +	Recycling
A.J. Rogers +	Recycling
Erin Szelagowski +	Recycling

\* Denotes Graduate Student Assistant

+ Denotes worked part of the year

## About the Cover

The cover of this year's annual report depicts the Joe Crowley Student Union with both the architects' drawing of the finished structure and a recent photograph of the building under construction.

This building was selected as our cover image because it touches on many aspects of UNR's EH&S while also representing the significant growth the University is experiencing and reflects the direction the University is going – that is toward a more sustainable future. As the University grows, the EH&S Department recognizes the need to maintain the strength of our nationally-recognized program for an ever-increasing number of programs, faculty, staff and students. The energy and water savings, improved indoor environmental quality, and reduced materials use that are the result of an integrative design striving for these goals reflect the direction this state and this University are moving toward our goal of being more sustainable.

The Joe Crowley Student Union (JCSU) is being built “green,” using the US Green Building Council's LEED standards as a benchmark. This same standard has been adopted by the Nevada State Energy Office as the official standard of the State of Nevada under the requirements set forth in AB3. Some of the features of the JCSU that make it green include daylighting and light controls to reduce energy use, high efficiency systems in electrical, mechanical, ventilation and water areas and the use of low VOC materials throughout to improve and maintain good indoor air quality.

In selecting the JCSU as our cover this year, EH&S takes a hopeful and positive view toward the future of UNR.

“Support and Oversight for a Sustainable University”

# EH&S Annual Report

- |  |
|--|
| <ol style="list-style-type: none"><li>1. Introduction and Overview</li><li>2. Costs of Providing EH&amp;S Services</li><li>3. EH&amp;S Information Systems</li></ol> |
|--|

## 1. Introduction and Overview

The UNR Environmental Health and Safety program was created in its present form in 1995. Although the program is now eleven years old and has matured significantly during this time, it continues to evolve. Continuing change in the EH&S program is to be expected, and in fact, is necessary to continue to fulfill the university mission to "ensure safe and healthy learning, research, work, entertainment, and living environments for students, staff, faculty, and visitors." The impetus for change can come from many sources: new regulations; expectations of students, staff, and faculty; and changing local and national priorities. The UNR program has experienced all of these motivations.

The terrorist attacks in 2001 resulted in increased concern regarding the safety and security of hazardous materials, which led to new regulations covering potential bioterrorism agents, and increased security requirements for certain ionizing radiation sources. Regulators have increased their emphasis on enforcement of reporting requirements for chemical air emissions through campus laboratory hoods. Compliance with these requirements requires strict tracking of chemicals as they arrive on campus, during their use in laboratories, and through disposal as chemical waste. Increasing concern regarding climate change and utilization of environmental resources at the local and national level has led to new expectations regarding the impact of university activities on the environment. Campus recycling programs have been initiated and are experiencing rapid growth. At the State level, lawmakers passed Assembly Bill 3 which contains energy conservation standards and mandates that State funded or sponsored buildings be designed and built as "green buildings." The Joe Crowley Student Union building, which is currently under construction, is the first such building on the UNR campus.

Although a formal Environmental Management System (EMS) has not been

implemented, the EH&S program has adopted some of these management techniques to help guide and monitor each of the EH&S disciplines. Implementation of the EMS principles of plan-do-check-act involves continued evaluation of program goals, objectives, and performance, with the objective of continual improvement. This process facilitates recognition and even anticipation of changing conditions. Continual appraisal of EH&S management plans will provide guidance for the EH&S program so that high quality services can continue to be provided while the program evolves to meet changing priorities. The data presented in this report are products of the management plans implemented by each of the EH&S functions. Because of the evolutionary nature of EH&S programs referred to above, it can be expected that the data displayed in future annual reports will differ from this 2006 report. Although there is value in knowing where we have been, the greater value of the data is in generating information and knowledge that can be used to help guide future activities.

## 2. Costs of Providing EH&S Services

Direct salaries and wages accounted for 74.2% of assignable EH&S expenditures in 2006. This figure does not include benefits since these costs are variable based on employment classification and benefit option chosen by each employee. Additionally, these costs are generally covered by central University budgets rather than department budgets.

For most of 2006, the EH&S staff consisted of 12 administrative faculty, 8 classified employees, and variable numbers of part-time graduate assistants and student employees (see organizational chart, Appendix 1-1). Two of the administrative faculty positions included in the above figures are assigned to the Information Technology (IT) division. One other administrative faculty position was assigned to IT for one-half of 2006 before being transferred to EH&S. At any rate, all three of these positions are primarily dedicated to EH&S



projects, reside in the EH&S department, receive EH&S administrative support, and the EH&S budget pays for computers, software, and other equipment and supplies. Since the work performed by these positions is directly associated with the cost of providing EH&S services, these positions are included in this budget summary.

EH&S staff are grouped into twelve budget groups based on functional areas. For the year 2006, some or all of these groups accrued expenses in the following categories: salary, educational materials/professional development, training, computer hardware, computer software, equipment, supplies, travel (non-professional development), outside laboratory work, licenses, contracts, and renovations. The departmental budget summary is illustrated in Table 1. As was previously indicated, salary and wages accounted for the vast majority of departmental expenditures in 2006. Other significant costs were equipment, supplies, and contracts. Expenditures in many of these categories are variable from year-to-year due to specific equipment needs, facility renovations, and staff changes. In 2006, three vehicles were purchased to support new programs or to replace older vehicles, renovations to the irradiator facility were necessary to support new security requirements, and multiple staff positions were vacant for a portion of the year.

**Table 1** EH&S Departmental Expense Summary for 2006

Categories	%
Total Salary & Wages (less benefit)	74.15
Edu. Mat. & Prof. Dev.	0.76
Training	0.35
Computer Hardware	0.96
Computer Software	0.39
Equipment	8.45
Supplies	5.23
Travel non-Prof. Dev.	0.12
Outside Lab Work	0.21

Licenses	1.12
Contracts	6.42
Renovations	1.83
<b>Total</b>	<b>100.00</b>

The relative costs of providing EH&S services in 2006 are displayed in Table 2. More detailed budget analyses are provided in the individual section activity reports in Section A.

**Table 2** Summary of 2006 EH&S Expenditures by Functional Area

EH&S Section	Percent of Expenditures
Radiation Safety	16.75
Hazardous Waste Management	16.53
Administrative/Office Management	15.60
Laboratory/Biosafety	9.16
Information Technology	8.25
Occupational Safety	7.31
Chemical Inventory	6.26
Air Quality/Ventilation	5.68
Environmental Affairs	4.33
Safety Training	3.77
Knowledge Management	3.43
Emergency Planning	2.94

Although the relative costs in Table 2 are displayed by functional area, it must be pointed out that these costs do not necessarily reflect the true cost to duplicate each function as a stand alone entity. This is due to the fact that some expenditures benefit multiple groups and cannot be clearly assigned to a single function. These common and infrastructure-type costs were assigned to the Administrative/Office Management group. The salary for the EH&S director was also included in this category. Additionally, although it is difficult to measure, all of the functional groups support each other

which further blurs the true cost of each of the functional areas.

Providing EH&S service to most campus work environments requires the contribution of multiple EH&S functional areas. From an EH&S services standpoint, laboratories are probably the most complex work environment at UNR. The expenditures of the Laboratory/Biosafety function (9.1%) represent only a fraction of the true cost of providing EH&S services to laboratory environments. The true cost is more closely represented by the combined expenditures (47.7%) of the Laboratory Safety/Biosafety, Hazardous Waste Management, Radiation Safety, and Chemical Inventory functions (other functional areas also provide support to laboratories but to a lesser relative extent). The same is true to varying degrees for other campus work environments.

### 3. EH&S Information Systems

#### Functional Role

Environmental health and safety programs involve significant recordkeeping, hazard monitoring, and documentation of workplace conditions, and therefore, are very data intensive. The role of the Information Systems (IS) group is to provide systems (both hardware and software), technical support and application development to support all the programs within the EH&S department.

#### Goals

One of the major goals for Information Systems is to create tools that allow each of the EH&S sections to collect, compile, analyze and report on activities associated with their particular function. Some of the data collected by the various sections is integrated with data from other departments to produce various risk scenarios. The four core components of the EH&S business model (people, places, objects and activities) are collected and are used to develop applications.

Another important goal is to provide a stable secure network environment where users can store and share information between the various departments.

#### Technology

Technology plays a key role in the collection, analysis, storage and delivery of large amounts of information. System upgrades were performed on the departmental systems to increase performance and storage. Updates are scheduled for the web services and the EH&S development server.

All new applications being designed for EH&S are built using Microsoft's 2.0 .NET<sup>®</sup> framework technology. Current applications using 1.0 or 1.1 .NET framework have either been upgraded or are planned for upgrade. Legacy applications are being split off to a separate server and will be converted as resources become available.

#### Specific Accomplishments

2006 brought another year of change in staffing for the Information Systems group. A new programmer analyst was hired in April to fill a vacated staff position. In May, EH&S lost a long time student to graduation who had filled the role of GIS Specialist. A new permanent staff position for a GIS Specialist within EH&S has been created and approved, and will be filled in 2007.

Data collection into the Integrated Data Management System (IDMS) continued to improve with focus on locations, inventory, hazardous materials, air quality, training, and radiation safety. The IDMS allows collection of data from the various EH&S sections into a central database. Data collected by EH&S helps identify sources of risks associated with UNR properties. Other sources of data are combined with IDMS data to create information which can be used to minimize these risks.

The IDMS is used in conjunction with a Geographic Information System (GIS) to relate relational and spatial information. A primary



task of GIS in 2006 was to reposition the campus buildings with the new half foot resolution ortho-photographs acquired from Washoe County. As we continue to collect new data in IDMS, we are able to integrate it with GIS. Visualization of data within IDMS allows users to answer questions about the data and its relationship to locations. The information derived helps EH&S identify and communicate risks associated with buildings, classrooms or laboratories.

The number one task for Information Systems this year was the creation and delivery of the Washoe County Air Quality annual report. Chemical inventory data collected over the past two years was combined with waste and purchasing records for the past year. Correlation of the data from the various data streams consumed a major part of IT resources for the year. Over a quarter of a million records were processed to generate a mass balance report of listed hazardous air pollutants and other volatile chemicals. This report was successfully delivered to Washoe County Air Quality on December 20, 2006, and allowed the University to renew its air quality permit for the laboratory hoods throughout campus.

Other projects included Asbestos Management, testing of Open Range software for management of air quality data, online incident reporting, a weekly status collection application, and desktop and server support for the Department.

#### Budget Distribution

Staff salaries were the major portion of IT expenditures in 2006 (82%). There were three IT administrative faculty staff members assigned to support EH&S projects during 2006; however,

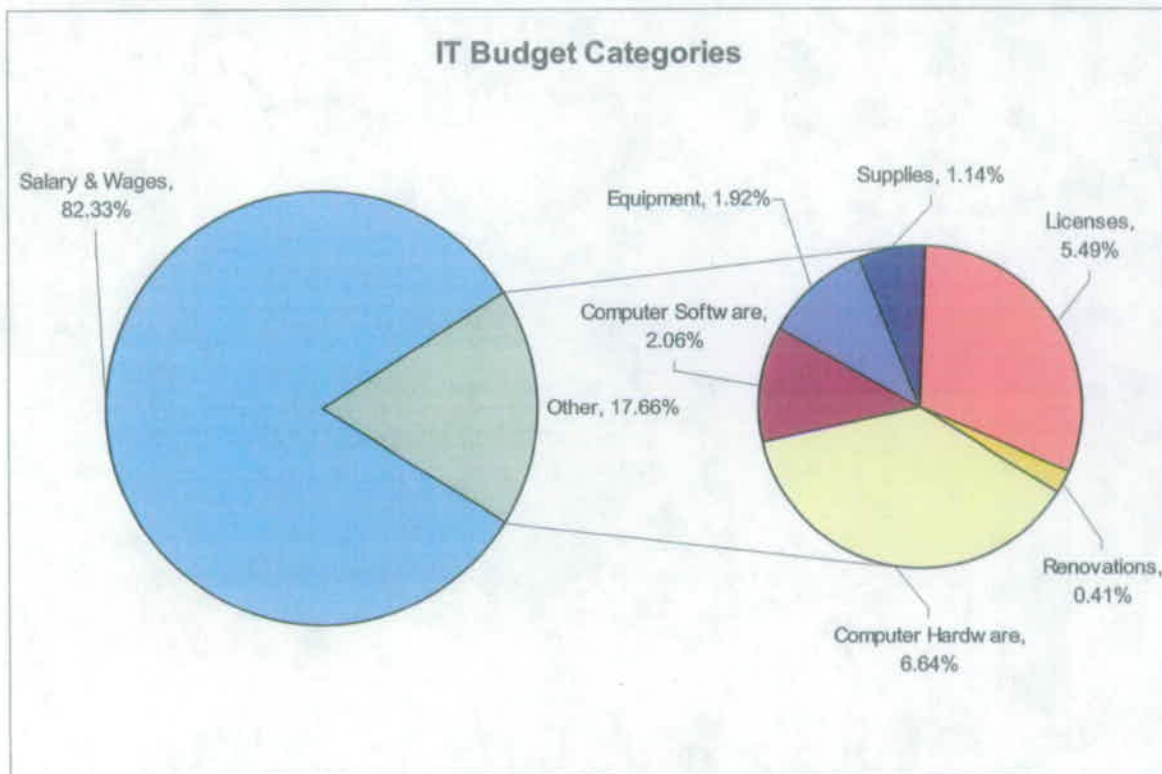
only one of these positions served in this capacity for the entire year. One of the staff members transferred from IT to EH&S midway through the year, and the other staff member was a new hire who did not work begin work in this capacity until April. Several student workers also provided valuable IT support to EH&S in 2006.

Outside of salary and wages, computer hardware was most significant expenditure category. Hardware included new servers, desktop computers, and monitors to update old hardware and to provide additional computing capability to meet growing needs. Costs for software licenses were also a significant cost.

**Table 3** Summary of Information Technology Expenditures

Categories	%
Salary & Wages	82.33
Edu. Mat. & Prof. Dev.	0.00
Training	0.00
Computer Hardware	6.64
Computer Software	2.06
Equipment	1.92
Supplies	1.14
Travel non-Prof. Dev.	0.00
Outside Lab Work	0.00
Licenses	5.49
Contracts	0.00
Renovations	0.41
<b>Total</b>	<b>100.00</b>

**Figure 1** Information Technology Expenditures



# **A. EH&S Section Activity Reports**

1. Laboratory/Biosafety
2. Hazardous Waste Management
3. Radiation Safety
4. Occupational Safety
5. Emergency Planning
6. Environmental Affairs
7. Air Quality/Ventilation
8. Safety Training
9. Knowledge Management
10. Administrative Support and Incident Reports



## A1. Laboratory Safety

### Functional Role

The Laboratory Safety Program is responsible for institutional management of chemical and biological agents in teaching, research, and service laboratories. Due to the wide variety of hazards present, laboratory operations are highly regulated by multiple regulatory groups. Additionally, granting agencies and the public expect laboratory activities to be conducted in a safe and responsible manner. The laboratory safety program assists laboratory personnel in meeting these obligations by providing campus-wide safety management programs, technical assistance and consultation, regulatory guidance and oversight, and education and training.

### Section Goals

The guiding principle of the laboratory safety program is to minimize risks to personnel, the environment, and university assets that arise from laboratory activities, while respecting and supporting academic research and teaching activities.

Specific goals of the laboratory safety program in 2006 were to improve: 1) laboratory safety practices, 2) management of laboratory chemicals, and 3) regulatory compliance and management of laboratory safety programs. Improvement in these three areas resulted in reduced risk to personnel, the environment, and university assets. Activities conducted by the laboratory safety staff in 2006 to achieve these goals included: conducting safety assessments of campus laboratories, communicating laboratory safety regulatory expectations and safe work practices to laboratory personnel, presenting laboratory safety training classes, reviewing biological agent safety protocols, conducting a campus-wide inventory of laboratory chemicals, managing the campus chemical inventory database, and providing technical support to both the University Laboratory Safety Committee and the Institutional Biosafety Committee.

### Activities

#### Laboratory Safety Assessments

Safety assessments of research and teaching laboratories and storerooms are conducted by the EH&S laboratory safety staff with each laboratory group visited at least once per year (Figure A1-1). Biological, chemical, and physical hazards in each laboratory area are evaluated with regard to regulatory compliance and good safety practices. EH&S provides a written summary report of each assessment to the responsible laboratory supervisor. These assessments provide an opportunity for direct two-way communication between EH&S and laboratory personnel. Through these assessments, EH&S is able to communicate laboratory safety expectations and provide recommendations to improve laboratory safety. Also, laboratory personnel can seek assistance with specific laboratory safety issues during this safety visit.



EH&S began conducting laboratory safety assessments in 1998, and started tracking the number of assessments in 2001. The number of laboratory assessments has increased from 2001 to 2006 due to more complete identification of UNR laboratory spaces, responsible faculty, and increasing the scope of the assessment program. Laboratory safety assessments are tracked by individual laboratory groups or PI. There were 138 individual assessments conducted in 2006 covering 451 rooms or facilities (many research



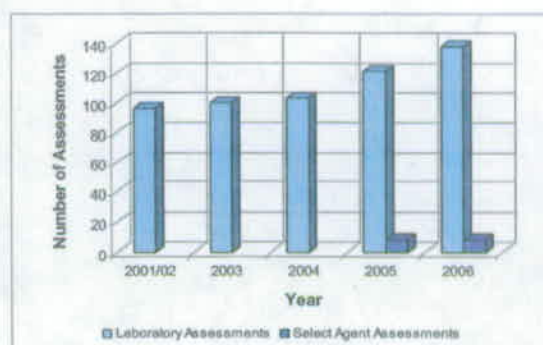
groups utilize multiple laboratory rooms/facilities). Though it is believed that almost all research groups and corresponding laboratory spaces have been identified by EH&S, this is constantly changing due to new investigators and reassignment of laboratory spaces. The increase in the number of laboratory safety assessments conducted in 2006 was due to expansion of the scope of the assessment program and the addition of new campus research groups. The scope of the laboratory assessment program has expanded from primarily traditional "wet labs" and now includes multiple laboratory types. For example, animal facilities, field research, and engineering research facilities involving physical hazards (such as in the Large Structures Laboratory located in the Harry Reid Engineering Laboratory) are now included in the assessment program.

In 2006, the laboratory safety group began tracking the resolution of deficiencies identified during assessments. Fifty specific deficiencies in twelve different safety categories were identified as guidelines for each laboratory assessment. In all, 313 laboratory safety deficiencies were noticed, and 218 of these were rectified during 2006. In past years, the laboratory safety assessments reviewed mostly routine safety and compliance issues such as reagent labeling, proper waste management, and proper chemical storage. Through the years the laboratories became more compliant with regard to these issues; therefore, the assessments began to focus on more basic deficiencies such as whether SOPs were written and followed, and whether laboratory specific training was presented and documented. The majority of the 95 unresolved deficiencies noted above were of this variety, and the laboratory supervisors will need time to comply. The EH&S department feels that similar to the routine deficiencies, these more intrinsic deficiencies will be corrected in time.

Members of the laboratory safety staff aim to meet with each new laboratory PI soon after he or she arrives on campus. These meetings allow the laboratory safety staff to learn about the research activities that each new PI will be

conducting, and the PIs are informed of their laboratory safety responsibilities and EH&S services and support that are available to assist them. In 2006, the laboratory safety staff conducted orientation sessions with seven new PIs (and in some cases their laboratory personnel as well). This is two less than the nine new PIs who EH&S oriented in 2005. This reduction was probably due to the expansion of the biochemistry program, and resulting new faculty members, in 2004-05.

**Figure A1-1** Laboratory Safety Assessments



Laboratories that use select agents in their work are subject to regulations promulgated by the Centers for Disease Control and Prevention (CDC). Facilities that possess select agents must be registered with the CDC, with renewal required at least every three years. UNR has two select agent facilities, one on the Reno campus and one in Las Vegas. The select agent regulations mandate that every facility that possesses select agents be inspected by EH&S at least once per year. In order to promote communication and stay abreast of operations, EH&S conducts more frequent select agent assessments that individually are narrower in scope, but which collectively are comprehensive. In 2006, quarterly assessments of both facilities were conducted. The number of quarterly select agent assessments of the two facilities that use select agents currently remains static at eight per year.

In addition to the select agent assessments conducted by the laboratory safety staff, the Las



Vegas select agent facility was inspected by the CDC in 2006. No deficiencies were noted by the CDC, and the inspectors commented on the great shape of the Select Agent program.

### Laboratory Safety Training

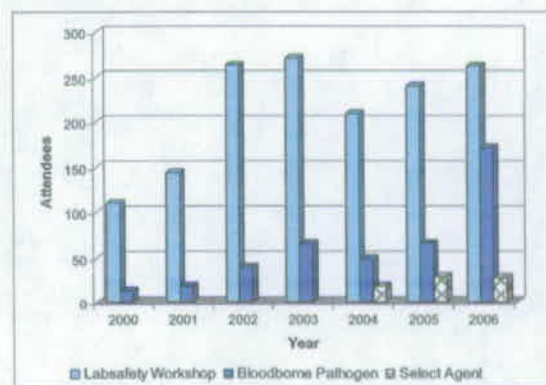
Laboratory safety staff presented training courses on multiple laboratory safety topics, with all courses being required by health and safety regulations (Figure A1-2). The primary course is the **laboratory safety workshop**, which is required for all personnel who conduct laboratory work with chemicals or biological agents. Topics covered in this course are: chemical hygiene, chemical waste management, chemical spill response, laboratory ventilation, and biological safety. The on-site laboratory assessments and e-mail notices to PIs are the primary communication medium used to broadcast the availability of training classes. Personnel are required to attend the general laboratory safety training course only once; therefore, individual research groups are expected to conduct continuing training as new hazards are introduced.

The number of persons attending general laboratory safety training has increased since tracking began in 2000. This increase is primarily due to increased communication of the availability of the EH&S course and the regulatory requirement to attend, and research growth at the University. The largest increase was seen in the first three years (2000 – 2003) as existing laboratory personnel attended the training, along with new personnel. Since 2003, training participants are primarily new laboratory personnel; therefore, the numbers of attendees has been relatively constant and proportionate to research activity at the University. In 2006, 10 training sessions were conducted with a total of 262 persons attending training (Figure A1-2).

Persons who work with human blood or other body fluids, unfixed tissue, or cells are required to receive **Bloodborne Pathogens (BBP) training** on an annual basis. Persons attending laboratory BBP training are a sub-group of the larger general laboratory safety training

audience, so the number of participants is much smaller; however, the trend in the number of persons who attended BBP training has historically been similar (Figure A1-2). Analogous to the general laboratory safety training, the number of persons attending BBP training has increased since 2000 due to better identification of personnel needing this training, and more effective communication of the availability of the EH&S course.

**Figure A1-2 Laboratory Safety Training Participation**



Attendance at BBP training is required annually, so yearly variation has historically been due to changes in the number of laboratory personnel working in existing laboratories.

The sharp increase in the number of training attendees in 2006 was due to an OSHA citation issued for non-compliance with BBP regulations in laboratory operations, primarily the annual training and hepatitis B virus vaccination requirements. Therefore, the laboratory safety staff began a campaign to comprehensively identify and include all laboratory workers that should be in the BBP program. This led to 172 personnel attending BBP training in 2006, compared to 66 in 2005. At the end of 2006, 18 of the 21 on-campus laboratories and medical clinics identified are in complete BBP compliance. Laboratory safety staff are working with the remaining three laboratories to resolve remaining compliance deficiencies, with the goal being 100 percent BBP compliance in 2007.



Select agent training was established in 2004 as a result of new regulations covering biological agents and toxins considered to be potential bioterrorism agents. Only laboratories and persons registered with the CDC Select Agent Program are required to attend select agent training. In 2006, three select agent training sessions were provided; One in Las Vegas, and two in Reno. These training sessions also included exercises to test the facility safety, security, and emergency response plans as required by the regulations. In 2006, 28 people were trained, which was almost identical to the 29 people who received select agent training in 2005.

#### Program Management

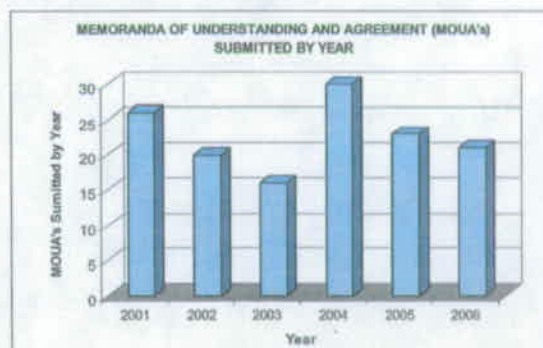
In 2000, the Institutional Biosafety Committee (IBC) began requiring that PIs who possess or use any biological agents or toxins (regardless of risk group or biosafety level) submit a Memorandum of Understanding and Agreement (MOUA) for approval by the Committee (Figure A1-3). The laboratory safety program supports the IBC and the MOUA process by communicating requirement to PIs, assisting them in completion of the forms, reviewing each MOUA as a member of the IBC, and managing MOUA protocols and associated databases.

In general, each PI submits one MOUA to cover all biological agent work; however, a few PIs have multiple MOUAs due to research projects that differ significantly from each other. Thus, MOUAs are not linked to a specific grant and the number of MOUAs submitted is not indicative of grant proposals or awards. Each MOUA is approved for three years, at which time a new protocol must be submitted for approval.

There was a large number of MOUAs submitted in 2001 with the initiation of the new requirement, and a declining number of protocols submitted in each of the next two years. The year 2004 began a new three year approval cycle, with 2006 being the last year of this second cycle. Although the trend is similar between the two three year cycles, more

MOUAs were submitted during each year of the 2004 – 2006 cycle. In 2006, 21 MOUAs were submitted; a 33% increase over 2003. Since the MOUA program is now relatively mature, these increases are thought to be primarily due to increasing research activity involving biological materials.

Figure A1-3 MOUAs Submitted to the IBC

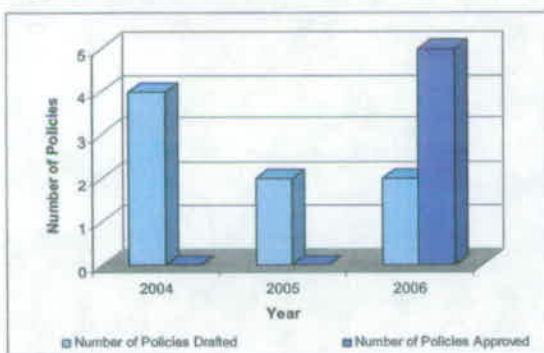


The University Laboratory Safety Committee (LSC) was established by the Provost in the spring of 2003 to provide guidance and administrative oversight of widely applicable laboratory safety issues. This committee is made up of five faculty members from science and engineering disciplines that collectively provide broad expertise in biological, chemical, and radiological safety issues. EH&S provides significant support to the LSC as the Radiation Safety Officer and Chemical Hygiene Officer provide technical expertise and guidance, perform technical writing, and assist in the identification and prioritization of laboratory safety issues.

The LSC works to reduce risks arising from laboratory activities by developing specific policies for consideration by the Provost as University policies. These policies do not simply reflect regulatory requirements since local concerns and circumstances are often not adequately addressed by regulations. When approved, these policies will collectively form a "University Standard" that defines laboratory behavior and operations at UNR.

The LSC met four times in 2006 and continued work on policy development, drafting two additional policies in addition to the six that were submitted to the Provost in the previous two years. The two policies developed by the committee in 2006 were: Laboratory Safety Assessment and Laboratory Supervisor Safety Responsibilities. Five policies were approved by Provost in 2006 as university policies. These are the first policies developed by the LSC that have been approved as university policies. In addition to policy development, the Committee spent significant time considering campus laboratory safety issues, including: campus chemical inventory management, safety and emergency infrastructure needs, and laboratory hazard and emergency communication.

**Figure A1-4** Policies Drafted by the LSC, and Approved by the Provost



#### Budget Distribution

As shown in the Introduction, Section 2., expenditures for the Laboratory Safety Program accounted for 9.1% of the total EH&S Program costs. Table A1-1 and Figure A1-5 illustrate the costs of providing laboratory safety services. Total direct salaries and wages accounted for the overwhelming majority of costs (95%), with supplies a distant second (2.2%), and several other categories accounting for less than 1% each.

The breakout of laboratory safety services is somewhat arbitrary and is not identical from institution to institution. At UNR, many costs

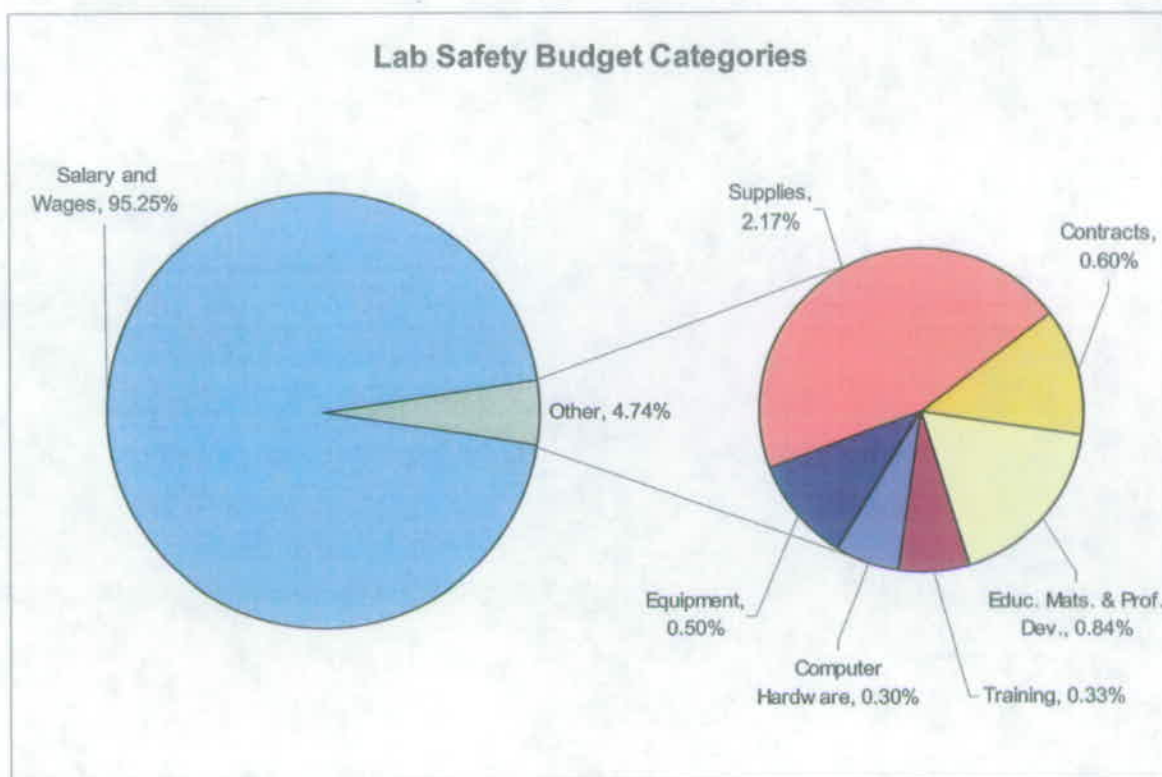
associated with providing EH&S services to laboratory environments are assigned to other functional areas. For example, hazardous waste management and chemical inventory are essential components of a comprehensive laboratory safety program whose costs have been separated out and are displayed as separate functions. Additionally, the radiation safety function primarily serves laboratory environments, with several other EH&S functions also providing essential services to laboratories. Thus, the exact cost of providing comprehensive EH&S service to laboratories is not easily determined; however, it is clear that the total cost entails multiple functional areas.

**Table A1-1** Summary of Lab Safety Expenditures

Categories	%
Salary & Wages	95.25
Edu. Mat. & Prof. Dev.	0.84
Training	0.33
Computer Hardware	0.30
Computer Software	0.00
Equipment	0.50
Supplies	2.17
Travel non-Prof. Dev.	0.00
Outside Lab Work	0.00
Licenses	0.00
Contracts	0.60
Renovations	0.00
<b>Total</b>	<b>100.00</b>



Figure A1-5 Laboratory Safety Expenditures



## Chemical Inventory

### Introduction and Background

An accurate inventory of campus chemicals is required by multiple regulatory groups, including the EPA, OSHA, and the State Fire Marshall. UNR has also entered into a regulatory compliance agreement with Washoe County District Health Department, Air Quality Management Division (AQMD), the details of which can be found in the 2005 annual report. Additionally, information derived from chemical inventory data is essential for effective laboratory safety programs, emergency pre-planning and response activities, space management and planning, and efficient management of laboratory operations.



In 2006, the campus-wide physical in-lab inventory was repeated with one full-time employee, two part-time student employees and oversight by a full-time manager. In August, the inventory program was expanded to include the interception and inventory of all chemicals delivered to UNR at the Central Services package receiving area. A full time staff member

was hired (new position) to support this additional function. The Central Services inventory was to provide one of two sources of "purchasing" throughput data required for the AQMD emissions mass-balance report. The new program at Central Services was the first step towards a "cradle-to-grave" chemical management program; however, the full program has not yet been implemented.

In 2006, the new activity of adjusting the volume or quantity of reportable air pollutants was added to the physical in-lab inventory procedures. Since 2004, the quantities of chemicals in the inventory were listed as full, regardless of their true volumes, allowing for conservative estimates of maximum allowable quantities. In adjusting the quantity of reportable chemicals, it was hoped the year end inventory quantities would better match up with reported waste quantities, which are closer to true estimates.

Only the quantities of reportable air pollutants were adjusted since adjusting the quantity of every item would have prohibited the completion of the inventory by the regulatory deadline.

### Inventory Methodology

Collection of an accurate inventory of laboratory chemicals required that each container be physically handled in order to collect necessary information and to place a bar code on each container. Inventoried containers included gas cylinders, 55-gallon drums, and 5-gallon containers; however, the vast majority was typical shelf-sized containers ranging from several milliliters to four liters.

The physical in-lab inventory was accomplished by using hand-held portable scanners to record all the bar code numbers from containers that were on the campus in 2005, and still on campus in 2006. The purpose for using the portable hand-held scanners was to reduce the time spent in the labs and to minimize container handling. As in previous inventories, any containers without bar codes (new chemicals), barcodes were affixed to and all the



necessary information was recorded on a spreadsheet with data entry performed after leaving the lab area.

As mentioned previously, the quantities of AQMD reportable chemicals were adjusted, whereas, they had previously been listed as full. The quantities were adjusted in 25% increments (full, 75%, 50%, or 25% full). For example, if a 1 Liter container was estimated to be ~ 25% full, 0.25 Liter was recorded as the quantity. The inventory team identified the reportable items by scanning bar codes into a pre-populated list of AQMD reportables on Excel spreadsheets extracted from ChemTracker. Typically, one inventory team member would scan the entire room with the portable scanner while the second team member would follow with the laptop, tethered scanner, and the list of reportable items.

After scanning an entire room, the inventory team would leave the lab area and manually update the dates in ChemTracker for each bar code scanned. Occasionally some items that were found on campus in 2006 had been deleted from ChemTracker in 2005. In these cases, the deleted items were restored to the database. The data for new chemical containers was also entered into ChemTracker after leaving the lab area. After completing all the data entry and updates for a given room, the inventory team would then identify all items with one year old dates, indicating they were not scanned or found in the room (missing items). The inventory team would return to the lab area for one last look for missing items and consult with lab personnel to determine if the missing items were consumed or transferred to another lab. If the missing items were not found, they were deleted from ChemTracker.

#### Results of the Campaign

The results of the 2006 inventory are summarized in Table A1-2 and compared to the previous two years. In 2006, only two new buildings were added to the inventory, both of which were existing structures that were already on campus but were overlooked or not checked prior to 2006. Both were small non-lab type buildings associated with the Harry Reid

Engineering Building. The number of rooms with chemicals (Final number of room with chemicals in Table A1-2) increased 3% in 2006. Increases in the number of rooms with chemicals occurred in several buildings, including Chemistry, Howard Medical, Laxalt Mineral Engineering, the additional buildings associated with Harry Reid Engineering, Palmer Engineering, Fleischmann Agriculture and Leifson Physics. The reasons for the increases include internal departmental expansions upon completion of room remodeling, and the discovery of existing areas that were not previously known to contain chemicals.

**Table A1-2** Container and Building Counts Performed by EH&S

	2004	2005	2006
No. of rooms inventoried or checked by EH&S	581	661	732
Final number of rooms with chemicals	581	640	659
No. of buildings inventoried	31	43	45
No. of containers inventoried and handled by EH&S	69,738	80,098	79,591
Number of actual containers in the database at years end (December)	69,738	74,539	76,199
No. of containers volume/mass adjusted	N/A	N/A	16,349

The number of chemicals handled by EH&S (79,591) was slightly lower but similar to the amount in 2005 (80,098). In 2005 and 2006, EH&S sometimes handled the same items multiple times, for example, if a lab moved all its chemicals to another room or building. During the course of the in-lab inventory, items that were once stored in ChemStores were found across the campus. Items from ChemStores were electronically "moved" in the database to reflect



the lab and owner information in other areas of campus. The ChemStores inventory was subsequently reduced without being replenished until the following year. Late in 2006, after completing the rest of the campus, EH&S decided to re-inventory ChemStores so its aggregate room quantities would be accurately represented. It is not known how inventorying ChemStores twice in one year might have affected the AQMD emissions report.

A snapshot of the actual number of items in the inventory database at the end of each year is shown in Table A1-2. In 2004, the database was only modified by EH&S staff and was static; however, starting in 2005 and continuing in 2006, some lab users began using the database on their own. The end of year database counts for 2005 and 2006 average out to approximately 75,300 items. The actual number of items represents a snapshot glance of the dynamic database as lab users add and remove their own containers. Some containers inventoried by EH&S are submitted for waste pick up and deleted from the database, which lowers the actual database count at years end.



The number of items that had their quantity adjusted was 16,349 (Table A1-2). In comparison, the final number of AQMD reported items in the 2006 inventory snapshot was 19,323 (Table A1-4, p. A-13); therefore, not all reportable items were identified and adjusted during the in-lab inventory. The list of reportable items is extremely large with broadly defined categories, and is impossible for any person to remember the names of all the items. Therefore, for each lab visited a list of reportable items was generated on an Excel spreadsheet by querying ChemTracker for the unique database number (called the GDN) for every reportable item. The GDN for each reportable item had to be searched manually since ChemTracker did not have a built-in single button query that would identify all the reportable items in one search. Also, not all of the reportable chemicals had a GDN number in the ChemTracker reference database at that time.

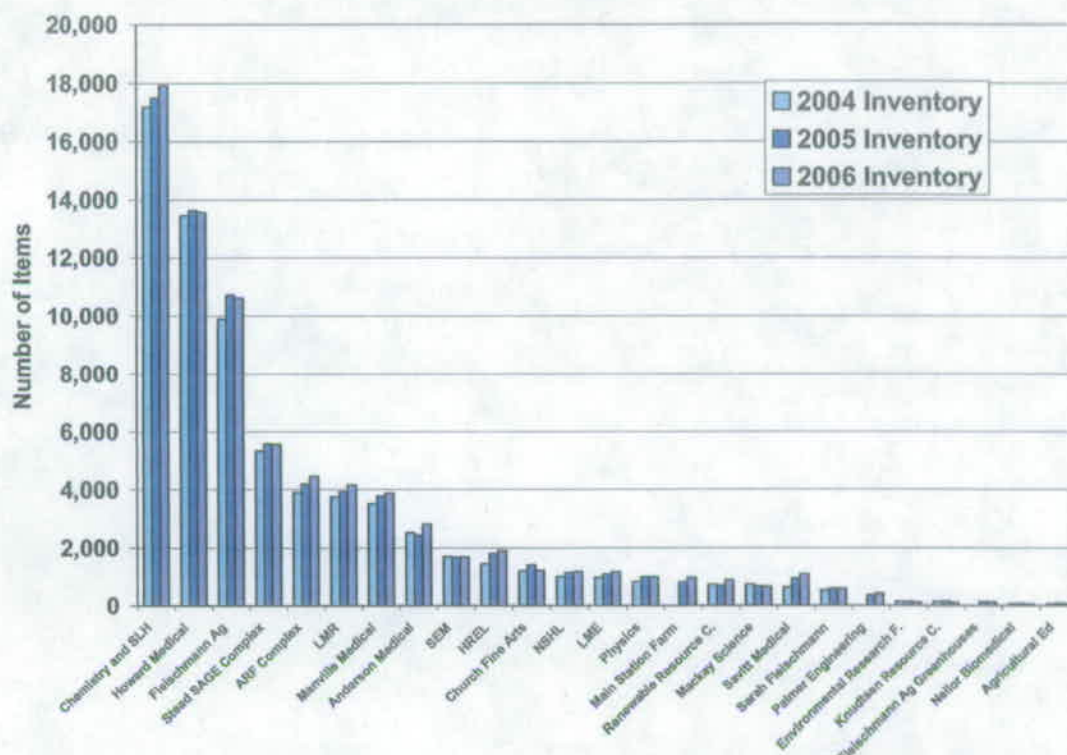
The number of containers inventoried by EH&S in 2006 compared to the previous two years is displayed by building in Figure A1-6. The sequence of the three buildings with the largest number of containers, Chemistry, Howard Medical Sciences, and Fleischmann Agriculture, has not changed in three years. These three buildings account for 56% of the total number of containers inventoried. Most buildings showed a slight increase in the number of containers inventoried in 2006.

#### Benefits to Laboratory Safety from EH&S Inventory Activities

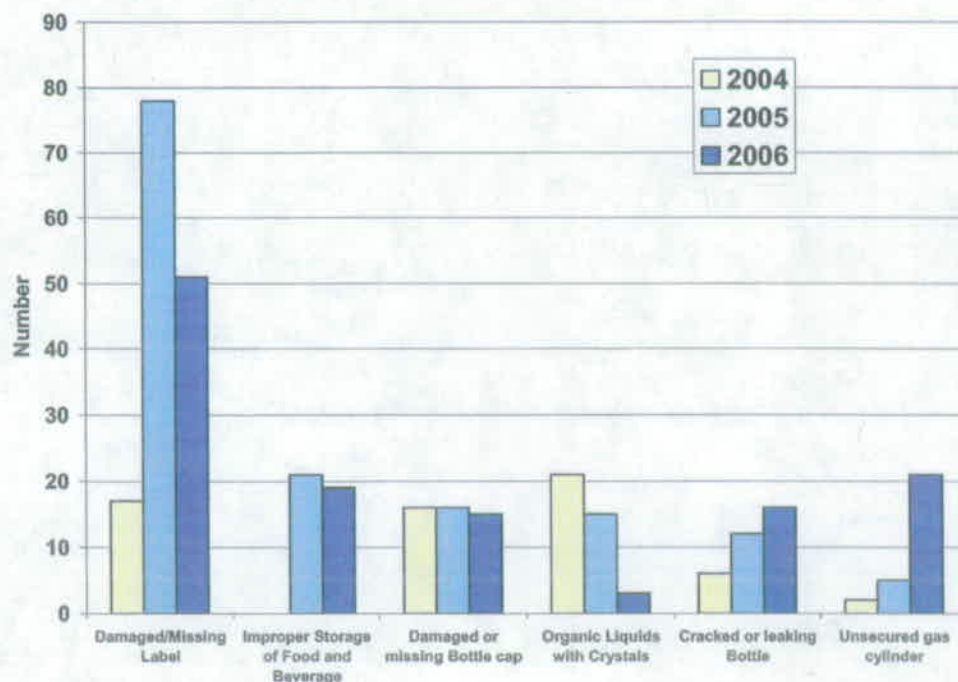
Due to the comprehensive nature of the inventory and the physical handling of each chemical container, many instances of improper chemical storage were identified and resolved with the cooperation of laboratory personnel.

Figure A1-7 illustrates the categories of reported storage issues: 1) damaged or missing labels, 2) improper storage of food or beverage items with chemical or biological materials, 3) damaged or missing bottle caps, 4) organic liquids with precipitate (an indicator of possible peroxide formation), 5) cracked or leaking containers, and 6) unsecured compressed gas



**Figure A1-6** Number of Containers in the Inventory Database by Building

Key to Figure A1-6: SLH = Schulich Lecture Hall; ARF Complex = Applied Research Facility USBM including Annex 1 and Annex 3 buildings; LMR = Laxalt Mineral Research; SEM = Scrugham Engineering/Mines; HREL = Harry Reid Engineering Laboratory; NSHL = Nevada State Health Lab; LME = Laxalt Mineral Engineering.

**Figure A1-7** Identified Chemical Storage Issues

cylinders. Issues were documented and reported to EH&S laboratory safety staff, who then worked with laboratory personnel to resolve the issues. The total number of container issues decreased from 147 in 2005 to 125 in 2006. Most of the categories showed decreases in the number of reported issues except for cracked or leaking containers and unsecured gas cylinders, both which increased compared to 2005. There are no known reasons why the number of cracked or leaking containers and unsecured gas cylinders increased in 2006. There were three reported organic liquids with crystals, all of which were found to be primary amines that probably formed amine salt crystals or amine oxides and are not on the list of known peroxide forming chemicals. The storage of consumable food along with chemical and biological materials continues to be an on-going challenge given the similar number of documented issues over the past two years.

#### Results of Central Receiving Inventory

As mentioned previously, on August 21 EH&S started a program to inventory all chemicals delivered to UNR at Central Services. A detailed discussion about this new inventory program is in the Special Projects section of this report (p. App.3-4). A summary of results between August 2006 and March 2007 are shown in Table A1-3.

**Table A1-3 Central Services Inventory Results**

	Total Packages Received	Packages with Chemicals	Individual Chemicals Inventoried
Average per day	356	15	36
Maximum in one day	640	39	306
Minimum in one day	140	4	4
Total in 2006 (Aug. – Dec.)	30,534	1,279	3,282

On average, UNR received about 350 packages per day. Between 80 and 100 items per day must be closely examined or have the packing slip opened to determine the contents. On average, EH&S inventories about 36

chemicals per day. The days with the largest number of chemicals have been the result of large shipments of chemicals to ChemStores, which supplies common chemicals for the entire campus. Between August 21 and December 31, the total number of packages containing chemicals was 1,279 and the total number of chemicals inventoried was 3,282. The number of chemicals inventoried is expected to be higher than the number of packages received as some packages contain multiple chemical containers.

Overall, the initial phase of inventory at Central Services went very well. The data from Central Services helped improve the quality of the emissions calculations, as discussed in the next section of the report. Expansion of the program to include EH&S delivery of chemicals directly to final labs and empty container pick-up is expected sometime in 2007.

#### AQMD Report Results

On December 20, 2006, the EH&S department submitted its second air emissions mass balance report to Washoe County Health District, Air Quality Management Division. The reader is referred to the 2005 EH&S annual report pages A-12 – A14 for a detailed explanation of the reporting requirements and categories, which were the same in 2005 and 2006.

The data analyzed for the 2006 report included the following sources:

- Chemical inventory single day snapshots (from ChemTracker) of the entire campus on November 1, 2005 and November 1, 2006
- Cumulative waste data from November 1, 2005 through October 31, 2006 (EH&S custom in-house database).
- SciQuest e-purchasing data from August 21, 2006 through October 31, 2006 (10 weeks).
- Central Services receiving inventory from August 21, 2006 through October 31, 2006 (10 weeks).

Despite internal software improvements to manage, analyze, and process the data, a significant portion of staff time was needed to



generate the final report. The most significant challenges were overcoming spelling errors in the waste data stream and determining the composition of trade name and branded mixtures to identify reportable components. The final number of reported items in each stream is listed in Table A1-4:

**Table A1-4 Final AQMD Report Statistics**

	Total Number of Items	Total Number of Reportable Items	Number of Discrete Items Reported
Inventory 2005	74,313	18,688	784
Inventory 2006	75,765	19,323	785
Waste	17,980	6,593	186
Central Services Inventory (Purchasing 10 weeks)	1,514	629	63
e-Purchasing (10 weeks)	194	165	64
Photographic Chemicals	557	557	7
Laboratory Synthesized Chemicals	254	254	191
Analytical Standards	318	318	45
Total	170,895	45,527	1,069

The total number of items represents the total number of line items that had to be analyzed in each data stream as reportable or non-reportable. For each category, the resulting number of reportable items is listed, followed by the number of discrete items. The number of discrete items represents aggregations by chemical. For example, 1000 total reportable line items of benzene would equate to 1 discrete reported item.

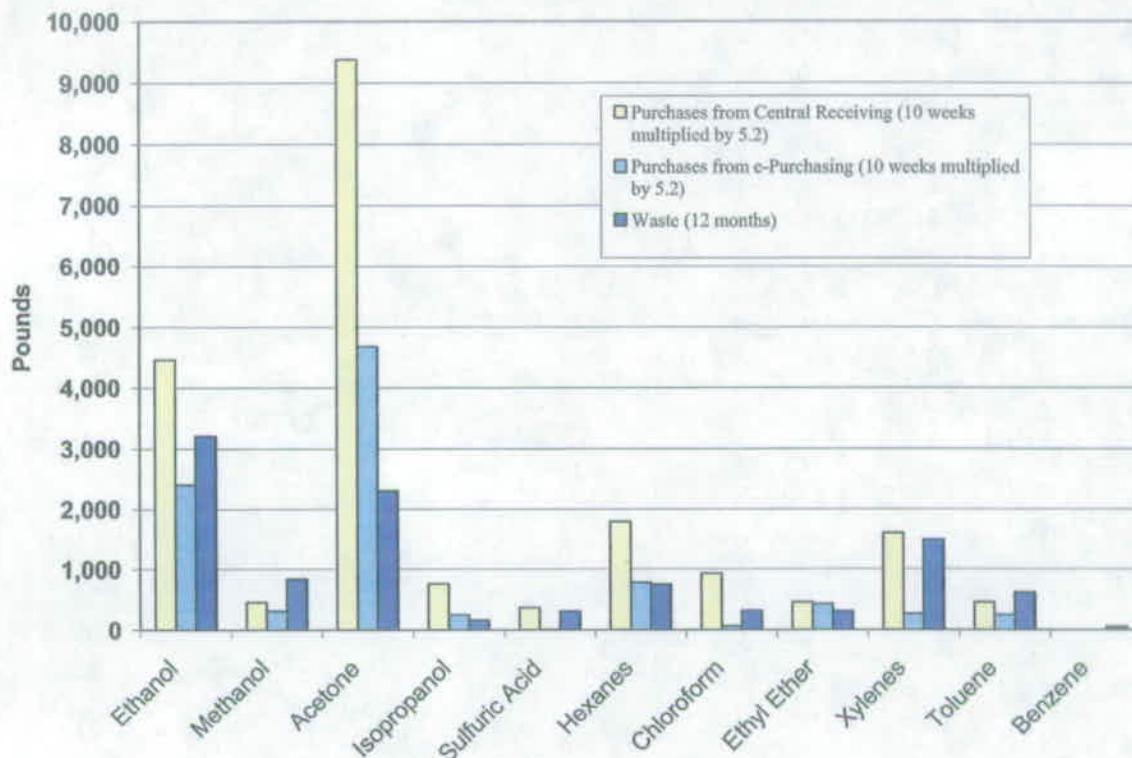
Three special categories of items, photographic chemicals, lab synthesized chemicals, and analytical standards were reported separately from the main list of hazardous air pollutants (HAPs) and volatile organic chemicals (VOCs). The photographic

and analytical standard chemicals are mixtures of chemicals containing one or more reportable components, typically in very low percentages. A great deal of time was spent determining the concentrations and components of the mixtures, and reporting them separately helped illustrate the effort and attention to detail put forth by EH&S to achieve compliance.

The lab synthesized chemicals were reported separately because they only appeared in the waste stream. These chemicals were created (synthesized) from commercially available building block chemicals; therefore, final products were not directly purchased. Lab synthesized chemicals were not included in the annual physical in-lab inventory of the campus so there was insufficient data to calculate estimated emissions. The majority of the reported lab synthesized chemicals were created and collected over decades of research and disposed of as part of a lab cleanout conducted due to impending retirement of a faculty member. All of the lab synthesized chemicals were solids that contained one of the EPA HAPs listed metals (mercury, nickel, etc.).

Figure A1-8 shows, for selected chemicals, a comparison between the quantities inventoried at Central Services, and those ordered through SciQuest e-purchasing. For comparison, waste data is also included to show throughput on the waste side. As discussed previously, only 10 weeks of data were collected from Central Services, so the equivalent set of data was used from e-purchasing to make a fair comparison. The Central Services and e-purchasing data were multiplied by 5.2 to create 52 weeks (12 months) worth of data for the emissions report. As can be seen for the items shown, the quantities of chemicals inventoried at Central Services were typically double those ordered through e-purchasing. For most of the reported items in the final AQMD report, the quantities inventoried at Central Services exceed those ordered through e-purchasing.

For the final AQMD report, both Central Services and e-purchasing data were supplied but the Central Services data was used to make the final volatile emissions calculations. The

**Figure A1-8** Purchasing and Waste Quantities for Selected Chemicals in 2006

quality of the emissions calculations in 2006 were much improved over the 2005 report. Only 17% of the total number of reported HAPS and VOCs had negative emissions, compared to 47% in the 2005 report. Negative volatile emissions are meaningless numbers and indicate a problem with the supporting data. In 2006, toluene had the largest negative emission of 140 pounds, most likely due to insufficient purchasing data. In 2005, the highest value negative was 4400 lbs for ethanol, and the next largest negative emission was 1260 lbs for xylenes. In the 2006 report, 4.5% of the items had negative emissions between 1 and 73 pounds. The remaining 12.5% of items had negative emissions of less than one pound. It is hoped that in 2007 a full year of actual receiving data will correct any data inconsistencies.

In 2006, more time was spent investigating items with negative emissions and many were corrected prior to submitting the final report. A few labs were re-visited to check specific items and correct database entry errors. In some cases, an item was reported as more than one final line

item because two synonyms were not recognized to be the same chemical.

In February 2007, Washoe County Health District issued a written statement indicating that the preferred means for gathering purchasing data was inventory at Central Services. The continued use of e-purchasing is under review by administration. Unfortunately, the number and types of chemicals to report in 2007 will not be reduced, due to the presence of some items with negative emissions in 2006.

EH&S will continue to try and improve the process to generate the air emissions report. It was hoped that improvement in the waste database would have been ready for the 2006 report, but they were not developed. At the time of the writing of this report, five months of waste data has already accumulated, without any database level associations to electronically identify and group identical chemicals together. However, improving the EH&S waste forms and associated background data is a high priority IT item for 2007. Using ChemTracker for inventory



and Central Services data, which represents new purchases, simplifies data processing for these streams.

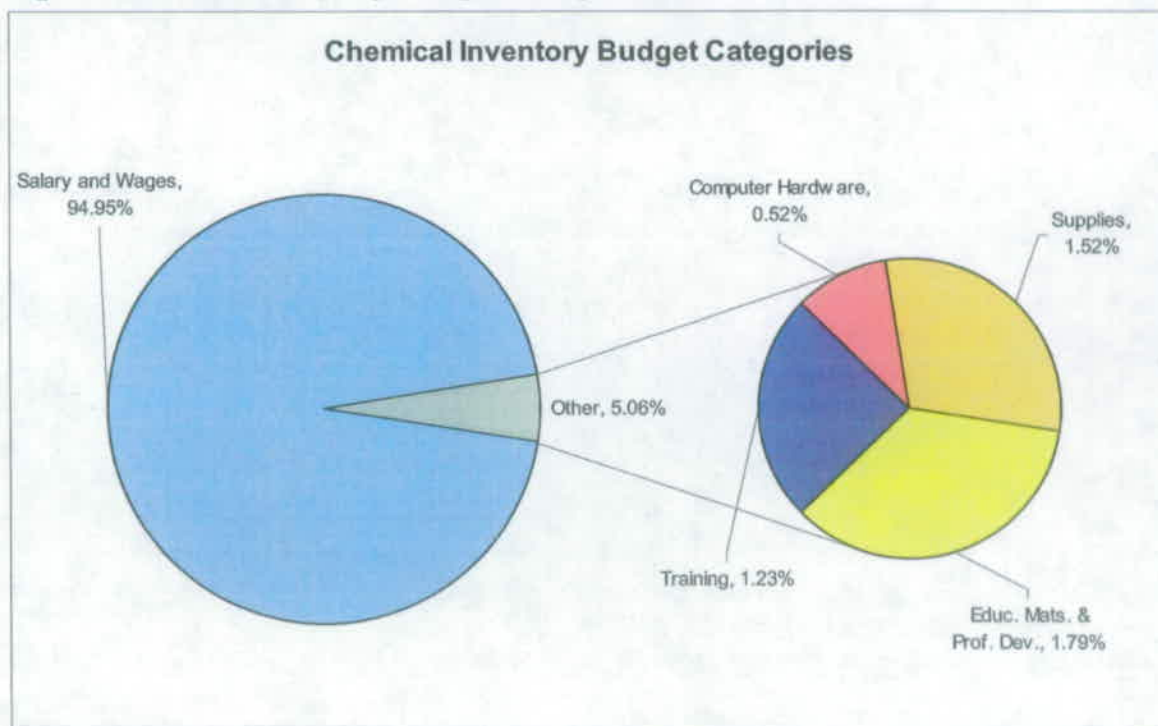
#### Inventory Budget

The inventory expenses from January 1 through December 31, 2006 are listed in Table A1-5. As can be seen, the majority of expense (95.95%) goes to salary. The remaining 4.05% is almost equally divided between educational materials/professional development (1.79%), supplies (1.52%) and training (1.23%). The professional development involved two inventory staff members traveling to, and presenting at, the 2006 CHSEMA conference in Anaheim, CA. Two inventory staff members received off-site HAZEWOPER training and physical examinations as their job descriptions are expanded to include cross-over training for waste activities. Supplies include general office items like phone and usage charges and also include start-up materials for the new inventory operations at Central Services. As both the physical in-lab inventory and the Central Services inventory are labor intensive, salary will always account for the biggest expense.

**Table A1-5** Summary of Chemical Inventory Expenditures

Categories	%
Salary & Wages	95.95
Edu. Mat. & Prof. Dev.	1.79
Training	1.23
Computer Hardware	0.52
Computer Software	0.00
Equipment	0.00
Supplies	1.52
Travel non-Prof. Dev.	0.00
Outside Lab Work	0.00
Licenses	0.00
Contracts	0.00
Renovations	0.00
<b>Total</b>	<b>100.00</b>

**Figure A1-9** Chemical Inventory Management Expenditures



## A2. Hazardous Waste Management

### Functional Role

**I**t is the role of the hazardous waste management section of the EH&S program to safely, efficiently, and legally remove waste chemicals from campus without creating risk or liability to people or the environment.

### Activities

In order to minimize potential risk and ensure the highest level of safety and security, as well as to comply with existing federal and state regulations, the EH&S department uses a web-based chemical waste pickup system to communicate generator requests. The system is an efficient and user friendly means of requesting waste removal and provides an accurate means of tracking waste generation and performance of the EH&S chemical waste workgroup.

In May 2006, the Nevada Division of Environmental Protection, Bureau of Waste Management (NDEP), conducted a comprehensive inspection to evaluate UNR's compliance with all applicable Federal and State hazardous waste management regulations. The inspection included random visits to laboratory spaces, Facilities shop areas, and the EH&S Hazardous Waste Facility. All aspects of hazardous waste management, from initial points of generation to shipping documentation for off-site disposal were reviewed. There were no violations noted by the NDEP inspector.

Two full-time staff employees and three part-time students are responsible for the safe removal of waste chemicals from the laboratories and their proper handling and packaging for ultimate off-site disposal. A major component of those tasks is the bulk transfer of liquid chemical waste from small accumulation containers to 55 gallon drums. This operation, which occurred 35 times in 2006, involves donning chemical resistant suits, respiratory protection and other personal

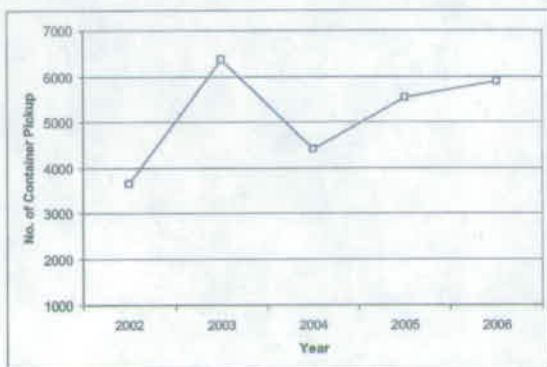
protective gear. For that reason, the entire group, including the student workers, is fully trained and qualified as hazardous waste workers (HAZWOPER) per OSHA standards. Additionally, when their assistance is requested, the staff responds to laboratory chemical spills and provides remediation services and/or advice for cleanups. Twenty-six such responses involving team members occurred in 2006. Other team duties include delivery of chemical waste containers; management of recyclables, electronic, and universal waste streams; and inspections of EH&S waste facilities and AED locations. The inspections were done weekly and accounted for more than 600 separate visits.

Other activities performed by the chemical waste management team in 2006 included:

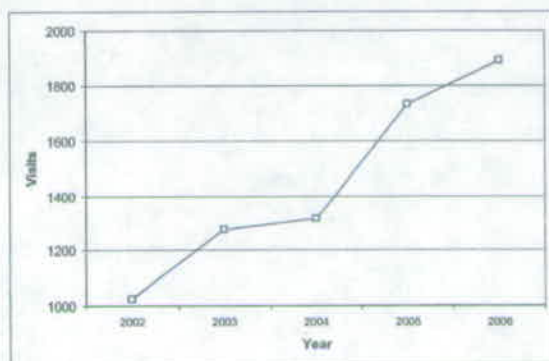
- Evaluated and tested 25 peroxide forming chemicals at the point of generation prior to pick up for disposal.
- Evaluated and tested 18 gas cylinders for potential re-use on campus or disposal.
- Hired and trained one replacement student worker.
- Internal cross-training of Chemical Inventory team members and Hazardous Waste Technicians.

Generation of chemical waste at UNR continued in an upward swing in 2006. This trend is consistent with comparable growth indicators in student enrollment and research dollars generated by the university (see section B1 of the Environmental report data). EH&S waste management activities have continued to increase as well. The number of waste containers picked up from campus in 2006 increased 10.4% over 2005 (Figure A2-1). The number of EH&S visits in 2006 to pick up full containers and deliver new or replacement containers increased by more than 9% over 2005 (Figure A2-2). The rise in the number of pickup/delivery visits indicates an increased workload. The average number of visits per workday has steadily increased over the past five years (Figure A2-3) and is now at nearly eight visits per workday.

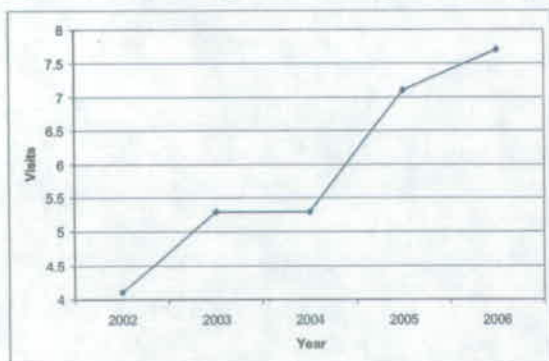
**Figure A2-1 Waste Containers Picked Up, 2002-2006**



**Figure A2-2 Lab Visit Activities, 2002-2006**



**Figure A2-3 Average Lab Visits per Work Day**



More than 49 tons of chemical waste were collected, packaged and disposed of by the EH&S hazardous waste management team in 2005. Waste was generated from instruction and research in medicine, chemistry, biochemistry, biology, mining, engineering, agriculture, art,

and environmental sciences as well as sports and facilities maintenance operations (Table A2-1). The Chemistry department is by far the largest contributor to the overall waste stream; having been number one for four of the past five years. The Nevada State Health Lab, normally a small contributor, was the second largest waste producer in 2006 due to a shut down of their acid neutralization system. All acid normally neutralized by the system was collected and disposed of by EH&S. Biochemistry rounds out the top three contributors. Collectively, they account for more than 53% of all hazardous waste generated on campus in 2006.

The types of waste picked up vary from non-hazardous, recyclables to highly dangerous chemicals in solid and liquid form (Figure A2-4). Pure and mixed chemical waste are by far the most prevalent waste types and these two categories accounted for 80% of all chemical waste pickup requests for the year.

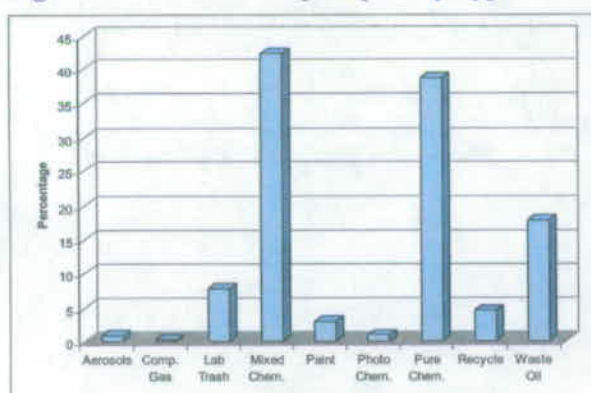
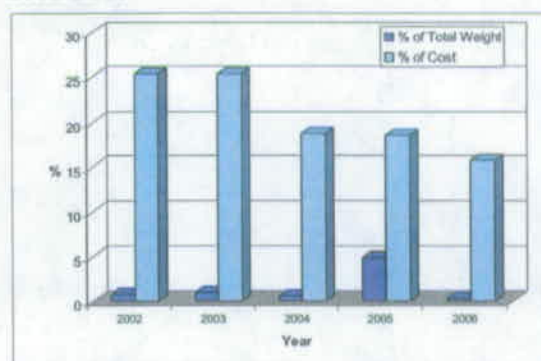
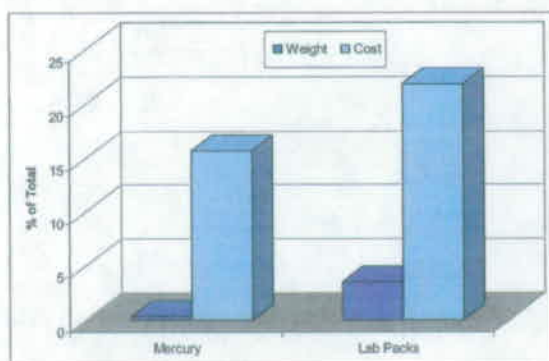
Although not large contributors to overall chemical waste generation, mercury (elemental compounds, and contaminated debris) and lab packed items (toxics, reactives, etc.) continue to be major cost factors for hazardous waste disposal. These two waste categories are less than 4% of the total waste accumulated on campus, but they accounted for more than a third of the overall cost for chemical waste disposal (Figure A2-5). Lab packs (individual chemical containers packed in a containment drum) are inevitable and required for proper transport and disposal of some wastes. Mercury continues to be an annual contributor to the cost of chemical waste disposal (Figure A2-6).





**Table A2-1 Top 10 Waste Producing Departments**

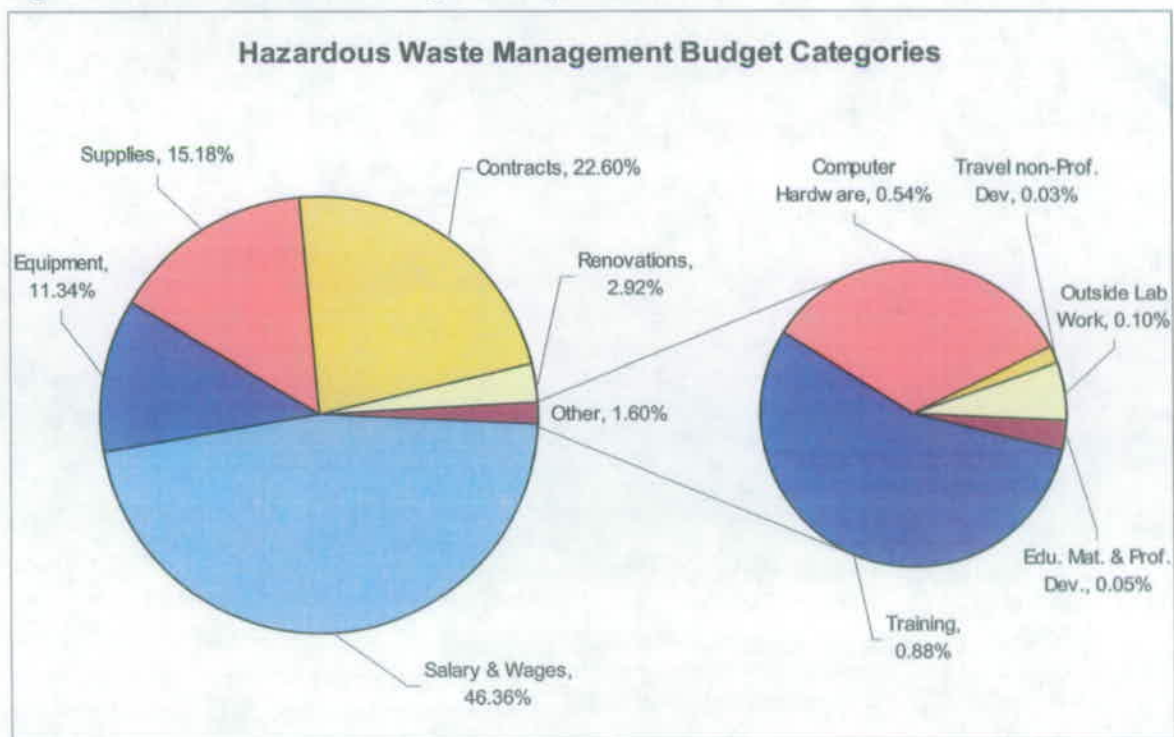
Department	Total lbs	% Total
Chemistry	34111	34.7
Nevada State Health Laboratory	11912	12.1
Biochemistry	6839	6.9
Environmental Health & Safety	6697	6.8
Art	5698	5.8
Pathology and Laboratory Medicine	5475	5.6
Chemical/Metallurgical Eng.	4794	4.9
Natural Resources and Environmental Science	4683	4.8
Biology	4494	4.6
Student Health Services	3246	3.3
All Other	10451	10.6
	98,400	100

**Figure A2-4 Waste Pickup Request by Type****Table A2-6 Cost vs Weight for Waste Mercury, 2002-2006****Table A2-5 Comparison of High Cost Waste for 2005****Budget Distribution**

Expenditures for the management of hazardous waste for 2006 had Salaries and Wages as the largest portion of the budget, with 46.6% of the distribution. Operating costs (equipment and supplies) accounted for 26.5 % and contracts (transportation and disposal costs) another 22.6%. This represents more than 95% of the Hazardous Waste Management budget.

**Table A2-1** Summary of Hazardous Waste Management Expenditures

Categories	%
Salary & Wages	46.36
Edu. Mat. & Prof. Dev.	0.05
Training	0.88
Computer Hardware	0.54
Computer Software	0.00
Equipment	11.34
Supplies	15.18
Travel non-Prof. Dev.	0.03
Outside Lab Work	0.10
Licenses	0.00
Contracts	22.60
Renovations	2.92
<b>Total</b>	<b>100.00</b>

**Figure A2-7** Hazardous Waste Management Expenditures

## A3. Radiation Safety

### Functional Role

The mission of the Radiation Safety Program (RSP) is to protect faculty, staff, students, and the public from unnecessary radiation exposures of ionizing and non-ionizing radiation and to facilitate safe utilization of radiation sources and lasers in education and research.

The RSP supports radiation and laser use laboratories by providing radiation and laser training, technical consultation, and oversight of ionizing and non-ionizing radiation uses according to the policies and procedures established by the Radiation Safety Committee (RSC).

The RSP manages all the required licenses, permits, and device registrations for the use of radiation and oversees all radioactive materials (RAM) on the campuses including acquisition, receipt, use, and waste disposal.

The RSP provides support and service to the northern components of the Nevada System of Higher Education (NSHE) which includes the University of Nevada, Reno; the Desert Research Institute (DRI) North and South Campuses; Great Basin College (GBC); Truckee Meadows Community College (TMCC); and Western Nevada Community College (WNCC). Radiation support services are provided to projects and facilities which have included UNR School of Medicine programs in Las Vegas, Cooperative Extension Program Offices statewide, and research projects conducted at the Department of Energy Nevada Test Site and at field research locations in Antarctic and other states.

### Goals and Objectives

The goals of the RSP in 2006, in addition to maintaining excellent services to radiation and laser users, were to coordinate the planned move of the irradiator to a new location; to minimize the irradiator down time and the cost associated

with the move; work towards full compliance with the new security requirement for the irradiator; identify class 4 and class 3b lasers on campuses; assist the laser facilities to accomplish safe laser operation; seek areas where computers may be used for better services, and strive to lower the sealed source inventory on campuses.

### Activities

#### License, Permits, Registrations, Amendments, and Inspection by Regulatory Agency Related to RAM and Radiation Use

The RSP maintained one RAM license, two permits for radioactive waste disposal, and thirty five registrations of accelerators and x-ray producing machines. During 2006, there were 38 principal investigators who were authorized to use RAM, 19 accelerators and x-ray producing machine users with 35 units, and 15 sealed source users with 102 sealed sources.

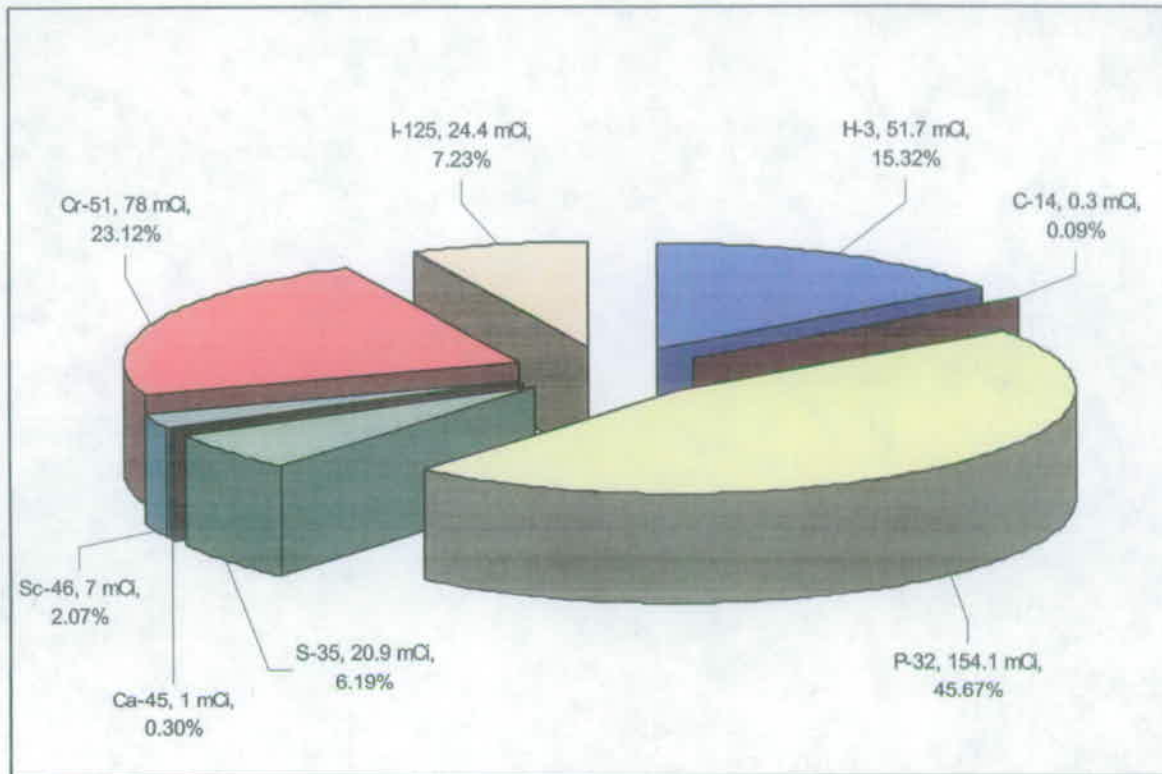
There were 10 license amendments or permit related filings to regulatory agencies to accommodate radiation use requests. We assisted DRI by obtaining appropriate licenses and permits to use a portable nuclear gauge in Arizona to measure soil densities and moistures.

#### RAM Procurements and Management

A total of 299 RAM packages totaling 342 mCi of radioactivity were received during 2006. There were 10 different radioisotopes ranging from H-3 to I-125 received at the UNR and DRI campuses. The most commonly used radioisotopes were P-32 and Cr-51; amounting to 154 mCi and 78 mCi, respectively. All RAM orders are approved prior to ordering to meet the radioactive materials license conditions. Each RAM order is approved after checking the requested radionuclide and radioactivity against current RAM inventory and the possession limits of the authorized RAM user. All incoming RAM packages are inspected, surveyed for radiation levels and contamination, recorded, and delivered to the final user.



**Figure A3-1** Radioactivity Received during 2006



To assist radioactive materials users in their quarterly inventory in 2006, a RAM inventory print out of the individual authorized principle investigators (PI) database was provided to each PI. The print outs allowed PIs to examine their RAM inventory and facilitated completion of the requested paper work for depleted RAM and update of RAM inventory.

#### Audits and Surveys of Radiation Use Facilities

Radiation/contamination surveys and audits of radiation use laboratories were performed to ensure safe working environments. A total of 599 radiation/contamination surveys and audits were performed in 2006. Twenty four cases of RAM contamination were handled in 2006. The incident reports were filed and distributed to affected laboratory personnel. When contamination is discovered, the Radiation Safety (RS) staff initiate an immediate clean up, oversee the clean up efforts, and verify

decontamination upon completion of the clean up. Additionally, accelerators and x-ray machine facilities were also surveyed annually.

#### Sealed Radiation Sources Management

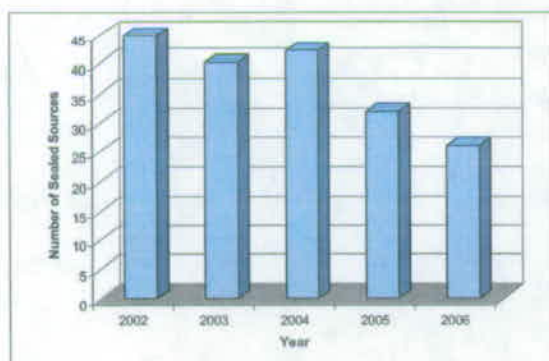
In 2006, there were 138 radioactive sources on campus totaling 1,765 Ci; twenty six sealed sources, eleven radiation counting instruments that contain radioactive sources, seventy five low level radioactivity sources (exempt quantity) on campuses, and twenty six sources incorporated into static eliminators. One of the sealed sources is the Mark I gamma irradiator.

The gamma irradiator is used for irradiation of animals used in cancer research to suppress animal immune systems, sterilization of material and biological samples, and pest control research. The gamma irradiator was used to perform 348 irradiations in 2006.

Leak tests of sealed sources are required and performed every six months. The presence of a sealed source is visually verified and swipes are taken from the source during a leak test. Swipes are analyzed by appropriate equipment capable of detecting various types of radioactivity. Leak test reports are filed and copies are provided to the sealed source owners. A report to the regulatory agency and immediate actions to minimize human exposure and property damage is required if a sealed source leakage is found.

Three sealed radioactive sources were returned to licensed facilities for recycling and/or disposal in 2006. This is part of an on going radioactive material inventory reduction policy.

**Figure A3-2** Number of Radioactive Sealed Sources on Campus (excluding exempt quantity sources)



#### Irradiator Relocation

The irradiator was moved to a new location. The RSP coordinated the move among irradiator users, licensed mover, and a new facility construction group to minimize irradiator down time and to coincide with the new room construction. The licensed mover was from Southern California. The 1,400 lbs of equipment used to move the irradiator had to arrive prior to the scheduled irradiator move. The move schedule had been changed several times because of construction delays. The move was successful, resulting in a minimal amount of irradiator down time (2 days).

#### Radiation Monitoring and Monitoring Instrument Calibration

The RSP monitors radiation exposures to radiation workers and radiation levels in areas where potential radiation exposure exists. The radiation monitoring program provides verification of the effectiveness of the radiation safety program. Monitoring of radiation exposure to radiation workers is also required by regulation. Personnel and area radiation monitors are exchanged and processed bi-monthly. Dosimetry reports are kept on file in the RSP and copies are provided to each group to inform individuals of their radiation exposures. Any abnormal circumstances are investigated and corrective actions to prevent re-occurrence are taken as soon as possible. A total of 1,071 personnel and area dosimeters were exchanged during 2006.

Calibrations of radiation detection equipment are provided by the RSP. Calibration frequencies are bi-annual and annual, depending on the instrument type. Calibration of survey meters are performed: 1) using an electronic signal generator for accurate response, 2) to see how the meter responds to various radionuclides, and 3) to see how the meter responds to gamma radiation from a gamma irradiator. Portable survey meters are equipped with radioactive standard check sources which are used to test proper meter responses. The RSP maintains a number of certified radioactive standard sources for calibration. Calibration documents are filed and copies are provided to the survey meter owners. Though most calibrations are performed in-house, some instruments are sent to commercial vendors for calibration. A total of 62 instruments are used for radiation monitoring on the UNR and DRI campuses.

#### Radiation and Laser Safety Training

All personnel who may handle or work around ionizing and non-ionizing radiation, such as RAM, radiation producing equipment, or lasers, need to receive appropriate safety training. In 2006, two hundred and forty-four people received various types of radiation/laser safety training. Radiation and laser safety training class



topics include radiation facts, potential radiation exposures, RAM handling techniques, ways to minimize exposure, biological effects, and safety precautions and regulations. Various training classes are provided depending on the type of work and level of risk involved. RSP provides the following classes: radiation safety, radiation safety refresher, irradiator safety, radiation safety awareness, and laser safety.

#### Laser Safety

The Laser Safety program is managed by the RSP. Assistance to laser-use laboratories, such as laser hazard analysis and mitigation, laser safety consultation, laser laboratory set up assistance, and all applicable warning labels and signs, is provided. Determination of the optical density (OD) required for laser safety eye protection goggles is an important part of laser safety. Fifty-two OD calculations and two hazard analyses and mitigations were performed in 2006.

#### RAM Transportation and Radioactive Wastes

All off-site shipping arrangements of radioactive materials are performed by the RSP.

Packaging, preparation of shipping documents, shipping arrangements, and

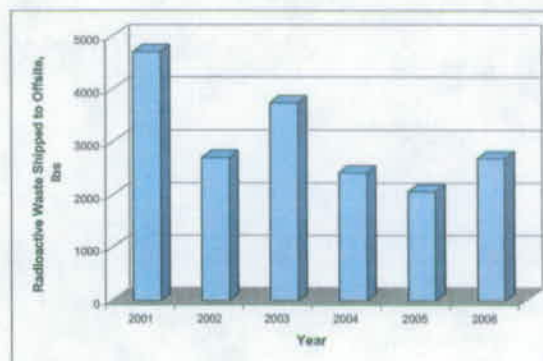


provisions for an emergency telephone number during transportation are included in this process. A total of 8 radioactive sources and two radioactive waste shipments were transported in 2006.

In 2006, a total of 2,952 lbs of radioactive waste and 431 liters of liquid radioactive waste were handled. The total waste shipped to off-site locations was 2,692 lbs.

Radioactive wastes with short lived radioisotopes are held for decay to reduce waste disposal costs. This waste is treated as ordinary trash after radioactive decay if there are no other hazards in the waste. In 2006, two hundred sixty pounds of dry solid waste and 147 liters of liquid waste were decayed onsite prior to disposal as ordinary trash.

**Figure A3-3** Radioactive Wastes Shipped from UNR



#### Budget Distribution

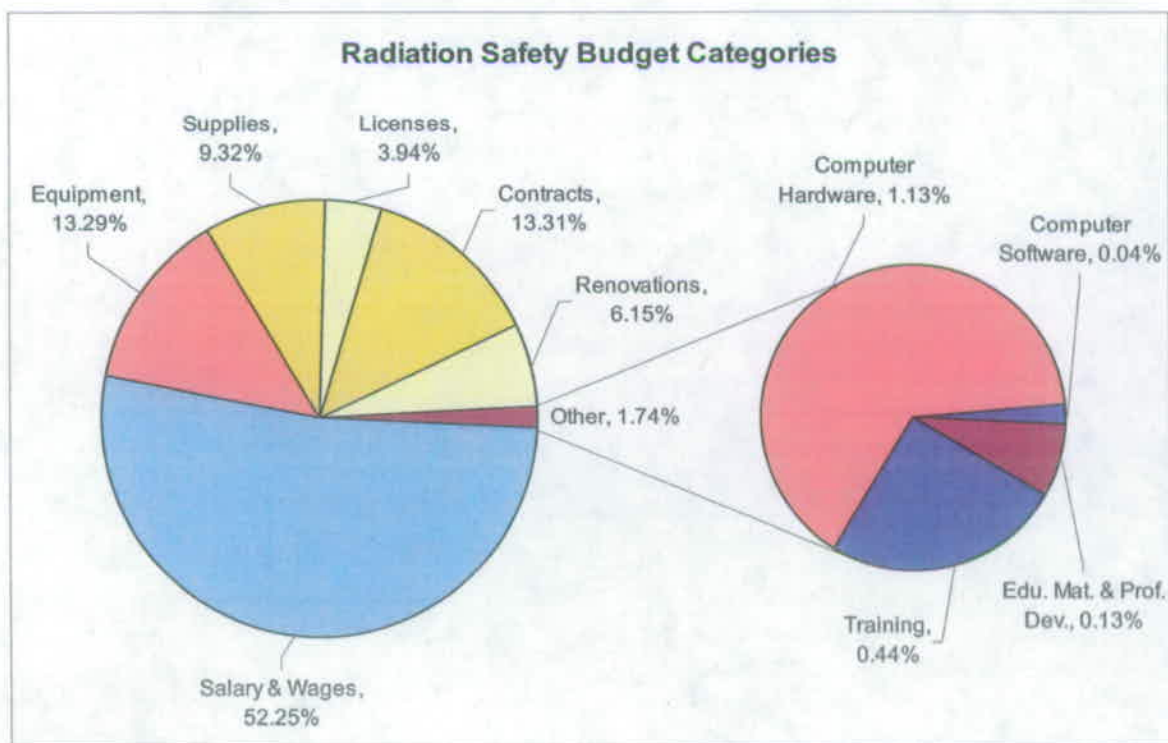
One half of the RSP budget was for the RSP staff salaries. The majority of the remainder consisted of contracts, equipment, and supplies.

- Equipment includes vehicle and radiation detection equipment.
- Contracts include radioactive waste disposal, equipment service contracts, and calibration.
- Supplies include radiation dosimeters and radiation safety items used in radiation use facilities.
- Renovations include facility upgrade to make radioactive sources more secure.



**Table A3-1** Summary of Radiation Safety Expenditures

Categories	%
Salary & Wages	52.25
Edu. Mat. & Prof. Dev.	0.13
Training	0.44
Computer Hardware	1.13
Computer Software	0.04
Equipment	13.29
Supplies	9.32
Travel non-Prof. Dev.	0.00
Outside Lab Work	0.00
Licenses	3.94
Contracts	13.31
Renovations	6.15
<b>Total</b>	<b>100.00</b>

**Figure A3-4** Radiation Safety Expenditures

## A4. Occupational Safety

### Functional Role

The functional role of the Occupational Safety Section is to serve as a resource for the reduction and/or elimination of accidents and injuries, and to provide assistance in helping the University community meet its occupational safety regulatory compliance requirements, through development of pertinent policies and training of University personnel.

### Goals and Objectives

Goals for 2006 continued to focus on developing and implementing computer based tools to improve inspection and audit capabilities of the Department and UNR personnel. These tools include a computer based self-audit system to allow UNR personnel to rank identified hazards and to assess work areas for compliance status. Due to competing information technology projects, progress in development of these computer based tools was limited.

Objectives focused on addressing risks and hazards identified in the occupational safety audit/inspection process, including the development of UNR policy statements in conjunction with the Occupational Safety Committee.

### Activities

#### Inspections and Audits

A total of 119 inspections and audits were conducted in 2006 (see Figure A4-1). Figure A4-2 summarizes 2006 inspection activities by inspection/audit type.

Figure A4-1 Inspection/Audits Conducted

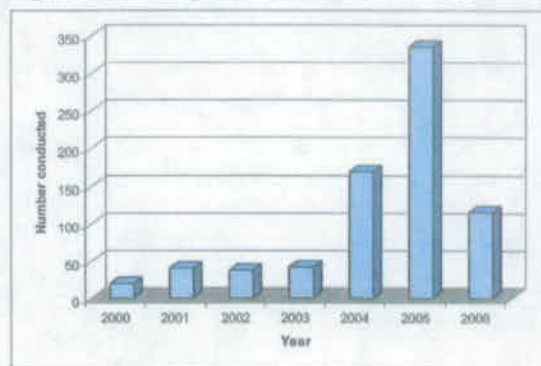


Figure A4-2 2006 Inspection and Audit Activity Summary

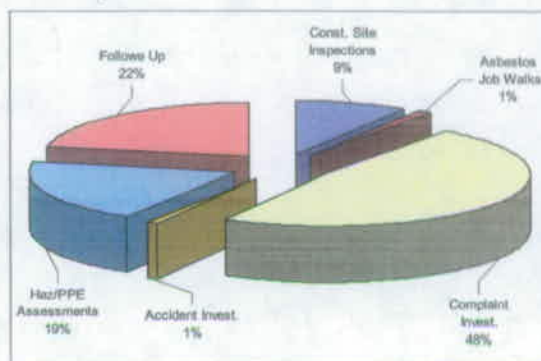
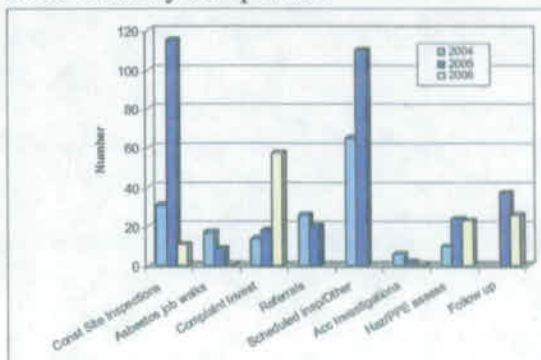


Figure A4-3 compares inspection activities conducted in 2004, 2005 and 2006. Follow up activities include items such as collecting occupational exposure samples, re-inspections, tracking the status of submitted work orders or efforts to identify other potential corrective measures.

Figure A4-3 2004, 2005 & 2006 Inspection/Audit Activity Comparison

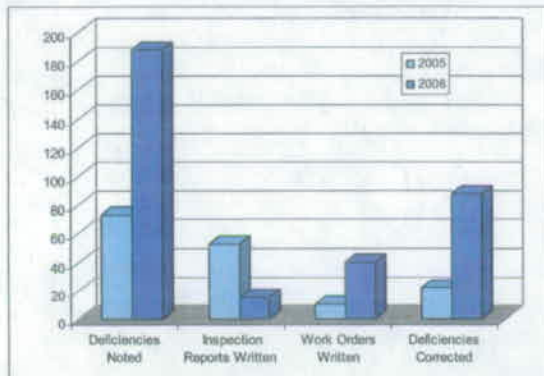




### Inspection/Audit Outcomes

EH&S began tracking data from inspections and audit results in 2005. Figure A4-4 shows outcomes for inspections and audits performed in 2005 and 2006.

**Figure A4-4 Inspection/Audit Outcomes**

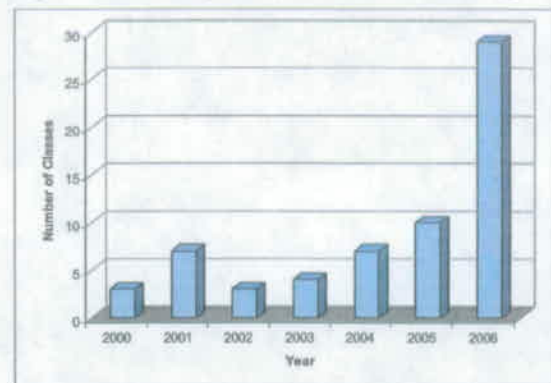


### Respiratory Protection

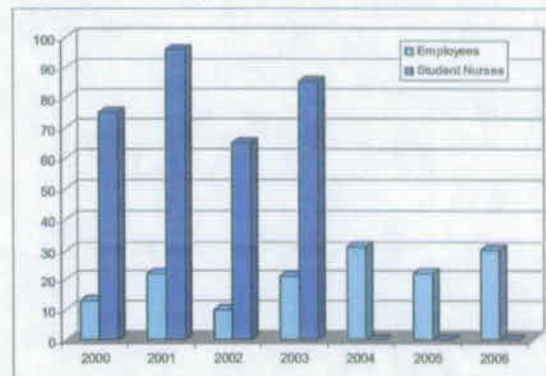
UNR has established a respiratory protection program which involves hazard assessment, employee training, medical determination and respirator fit testing. Initial training is provided for employees who have not previously been assigned a respirator. Annual refresher training and fit testing are provided for employees who have been previously assigned a respirator. Figure A4-5 shows the number of all respiratory protection classes (initial & refresher) provided to UNR employees.

Respiratory protection services were previously provided for students in the Orvis School of Nursing who were required to wear respirators when working with tuberculosis patients. However, recent changes in OSHA regulations resulted in local medical facilities assuming responsibility for fit testing of these students (see Figure A4-6). These changes have allowed for increased inspections and audits which have resulted in identification of additional employees that require the use of respiratory protective equipment. As a result, additional fit tests and training have been conducted in recent years (see Figures A4-5 & A4-6).

**Figure A4-5 Respiratory Protection Training**



**Figure A4-6 Respirator Fit Tests Conducted**



### Asbestos Management Program

Late in 2003, changes in assigned duties were made to the September 9, 2002 version of the University of Nevada, Reno's *Asbestos Management Plan*. As a result of these changes, EH&S no longer collects asbestos samples for remodeling or renovation projects. EH&S has retained responsibility for the maintenance of records of asbestos survey results and findings. (see Environmental Section, page B-7)

### Budget Distribution

The majority of Occupational Safety was associated with salary and wages.

Other expenditures included:

- Travel to the American Industrial Hygiene Association Industrial Hygiene Conference for professional development.
- Asbestos licensing fees.

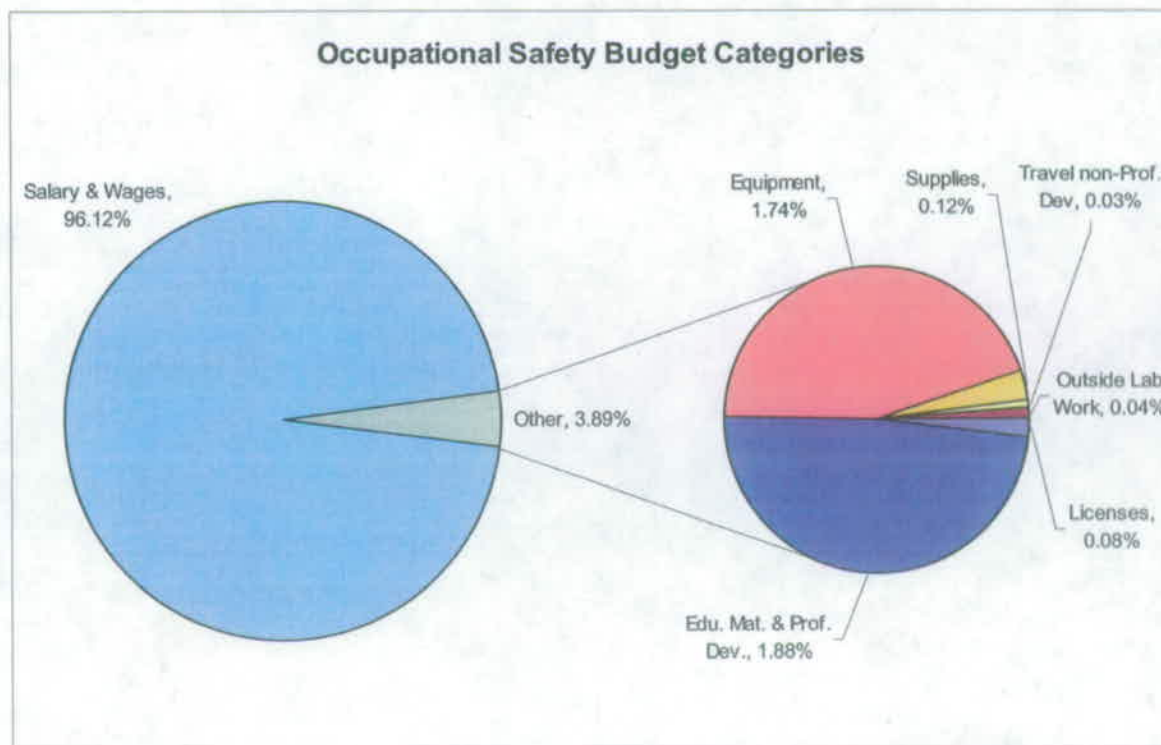


- General supplies and phone charges.

**Table A4-1** Summary of Occupational Safety Expenditures

Categories	%
Salary & Wages	96.12
Edu. Mat. & Prof. Dev.	1.88
Training	0.00
Computer Hardware	0.00
Computer Software	0.00
Equipment	1.74
Supplies	0.12
Travel non-Prof. Dev.	0.03
Outside Lab Work	0.04
Licenses	0.08
Contracts	0.00
Renovations	0.00
<b>Total</b>	<b>100.00</b>

**Figure A4-7** Occupational Safety Expenditures



## A5. Emergency Planning

### Functional Role

The role of the EH&S emergency planning program is to plan for emergencies and disasters that could occur on campus, affecting the safety of personnel and facilities. The emergency planning program supports campus departments in the development and testing of their emergency plans via technical assistance, guidance and consultation. Building emergency plans ultimately interface with the overall campus emergency plan in case low to moderate risk events evolve into major emergencies.

### Goals and Objectives

Specific goals of the emergency planning program in 2006 were to: (a) develop and implement a building emergency planning strategy that will interface with the UNR Campus Emergency Plan, (b) practice and exercise building emergency plans and adjust accordingly, and (c) implement disaster-resistant university strategies via hazard identification and mitigation in order to improve overall safety. Objectives to achieve these goals included: development of individual campus building emergency plans; development, implementation, and maintenance of the Building Evacuation Drills program; support of activities and events to integrate campus emergency planning programs with community resources; identification of hazards (assessment) and development of plans to mitigate identified hazards.

### Activities

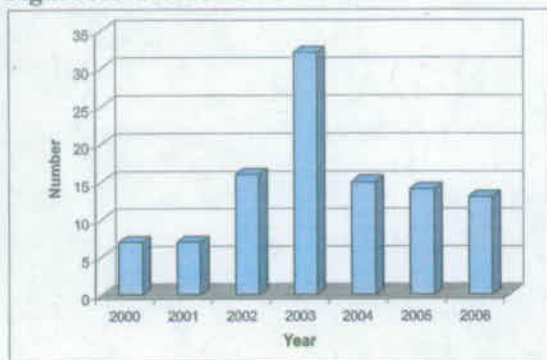
Although an Emergency Planning Template is posted on the EH&S website which campus building coordinators may use as a guide to develop their emergency plans, the Emergency Planning Coordinator has learned that building coordinators are more receptive if he develops the plan for them.

The Emergency Planning Coordinator actively worked with departments in 15 buildings during 2006 to assist them in developing or revising custom emergency plans. Additionally, workshops were coinducted for nine (9) buildings with 133 employees who had new emergency plans.

During the year, the Emergency Planning section coordinated regular emergency evacuation drills to test building emergency plans and evacuation procedures. There were 13 evacuations of campus buildings involving a total of 2420 persons at which pictures and evacuation times were recorded. Assistance from the Reno Fire dept. and EH&S staff was provided to direct building occupants during the evacuations; recommendations were provided at the debrief of each event. Distinctive building evacuation vests were provided to building coordinators so that they would be easily identified during practice or real evacuations.





**Figure A5-1 Evacuation Drills****Additional 2006 Events and Activities:****Pandemic Influenza Plan**

The Emergency Planning Coordinator spent significant time in 2006 researching and developing a pandemic influenza response plan. Significant accomplishments included:

- Researching national, state and other universities' pandemic influenza plans.
- Attendance at several workshops conducted by the Washoe County District Health District.
- Appointment to the Pandemic Influenza Coordinating Committee of the Washoe County Health District.
- Briefing campus leadership regarding the plan, then reviewing departmental responses.
- Briefing the Board of Regents regarding the UNR Pandemic Influenza Plan.
- Briefing the Safety, Health & Environmental Planning Advisory Committee (SHEPAC) of NSHE on how to develop a similar plan for other NSHE.
- Participation in two (2) tabletop exercises regarding pandemic influenza.

**Community Involvement/Outreach**

Meetings were held regularly with emergency organizations (Washoe County Local Emergency Planning Committee, Reno Fire Dept., National Weather Service, Nevada Earthquake Safety Council, American Red Cross chapter, etc.) to coordinate UNR emergency planning with community efforts.

**Evacuation Planning**

- Prepared a draft campus evacuation plan to coordinate with Washoe County and the cities of Sparks and Reno.
- Was appointed to represent UNR on the Nevada Statewide Evacuation, Mass Care & Sheltering Planning Task Force.
- Prepared an updated proposal to provide evacuation chairs for disabled students and faculty. Proposal was submitted to the campus Disability Resource Coalition.

**Hazard Mitigation**

During walk-throughs of 15 campus buildings, several minor hazards were identified that were easily mitigated by installation of directional signs and movement of furniture to improve evacuations.

**Buildings Seismic Structural Survey**

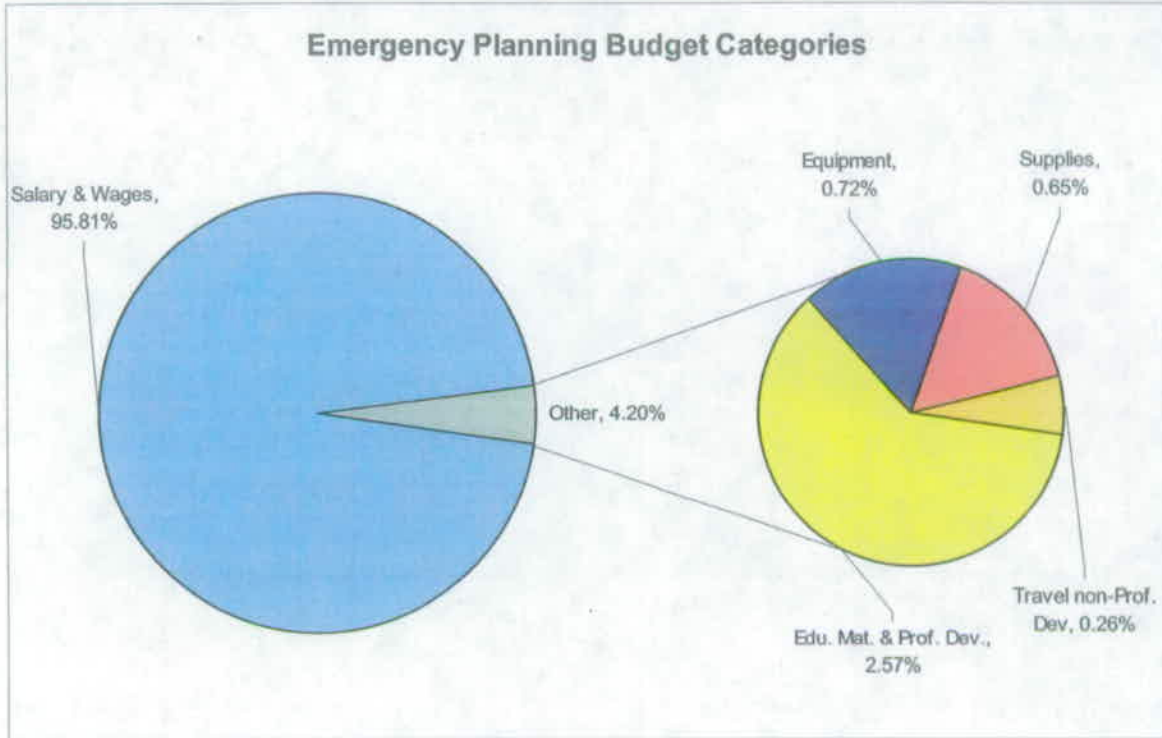
A structural survey was contracted using a Disaster Resistant University grant for an engineering firm to assess the seismic vulnerability of all UNR buildings. Consequently, two older residential buildings have been identified as priorities for seismic retrofit and a detailed analysis was completed on these buildings.

**Professional Development**

- Completed five (5) online emergency management courses offered by the FEMA Emergency Management Institute.
- Attended national conference of the Intl Assn of Emergency Managers and served on three (3) of their committees.
- Attended "Understanding the Dangers of Agroterrorism" course offered by the Western Institute of Food Safety and Security, UC Davis.

The **Emergency Planning Advisory Committee** has discussed development of systems to notify campus personnel regarding emergencies via outdoor sirens and loudspeakers, intranet, and message boards.



**Figure A5-2** Emergency Planning Expenditures**Table 5-1** Summary of Emergency Planning Expenditures

Categories	%
Salary & Wages	95.81
Edu. Mat. & Prof. Dev.	2.57
Training	0.00
Computer Hardware	0.00
Computer Software	0.00
Equipment	0.72
Supplies	0.65
Travel non-Prof. Dev.	0.26
Outside Lab Work	0.00
Licenses	0.00
Contracts	0.00
Renovations	0.00
<b>Total</b>	<b>100.00</b>

Budget Distribution

The majority of the emergency planning expenditures was for the salary of the Emergency Planning Coordinator.

Other expenditures included:

- Travel to the annual conference of the International Association of Emergency Managers for professional development.
- Reflective emergency vests (equipment) which are provided to campus Building Coordinators for use in emergency evacuations.
- Office supplies – binders and pens.
- Travel to a Board of Regents meeting to discuss the campus Pandemic Influenza Plan.

## A6. Environmental Affairs

The position of Environmental Affairs Manager (EAM) was created to manage UNR-EH&S responsibilities in three tiered levels; environmental permit compliance, identification of pollution prevention opportunities, and promotion of sustainability concepts across operational, academic and research lines. Successful achievements in these areas would assure regulatory compliance, limit environmental impacts, reduce resource consumption rates, and directly improve long term public and individual health of the diverse communities affected by campus operations.

Significant strides in all three areas have been made since the position was created in 2002. In 2006, a new person took over the EAM position and has begun to put his own personal stamp on the position. In addition, the passage of AB3 by the Nevada Legislature in 2005 set the stage for Nevada and NSHE to serve as leaders in the field of Green Building, which is one of the main personal and professional interests of the current EAM.

### Environment Permits

Since starting in March, the new EAM has taken over the monitoring and maintenance of the sewer discharge permits and continues to stay actively involved with Facilities Maintenance in tracking the sand-oil separator permits.

The most significant issue that the EAM addressed this year was the air discharge permit for our laboratory fume hoods. This is accomplished through a campus-wide mass balance and the effort this year focused on improving our data collection and data processing efforts. Through the combined efforts of the EAM, the Chemical Inventory team and the IT staff, an acceptable report of over 900 individual chemicals was delivered to Washoe County prior to our deadline. The report indicates that we are well below the regulatory thresholds that would put us in a higher emitter category. We will continue to work with

Washoe County Air Quality Management Division to develop the tools to continue enhancing and improving the accuracy of our reports.

We are still awaiting communications from Washoe County regarding our exact status, but we have complied with the requirements and believe we are in full compliance.

Two other permits with Washoe County are for the Central Heat Plant and the backup generators. These were reviewed and inspected in December of 2006 and all conditions were being met. Three generators were started and checked as part of this review and we modified the permit to include additional generators coming on line in the next year.

The City of Reno issues permits for our wastewater discharge and we are required to submit semi-annual self-monitoring reports to the City. These self-monitoring activities took place in May and November of 2006 and no violations of the discharge permits were found.

Other (non-regulatory) environmental sampling and analyses conducted this year were to address concerns over water quality for a laboratory process in Mackay Science and concerns over drinking water quality in Palmer Engineering.

### Sustainability

In terms of moving UNR and NSHE forwards on sustainability issues, the EAM has been actively involved in planning, policy drafting and communicating with the broader campus and other NSHE institutions.

A summary of EAM activities in the sustainability area includes:

- Updated statement on sustainability for SHEPAC.
- 2-page review of recent studies on green building costs.
- Attended SHEPAC meetings and promoted the benefits of green building and sustainable development.

- Attended design meeting for the Center for Molecular Medicine building and promoted LEED adoption.
- Worked with Dr. Gecol's group on biodiesel research.
- Reviewed plans for greenhouses on Valley Road.
- Secured funding for photovoltaics on the 4-H camp new dorm.
- Worked with Facilities on LEED submittals for the 4-H camp, and is serving as the LEED AP of record for that project.
- Developed a draft sustainability policy for NSHE.
- Wrote a campus sustainability initiative with Mike Collopy of UNAE.
- Attended the NSHE "Green Group" meeting in Las Vegas.
- Attended C2E2 conference in Ithaca, NY.
- Attended AASHE conference in Tempe, AZ.
- Attended USGBC's GreenBuild in Denver, CO.

For the State of Nevada the EAM also was on the planning committee for the Governor's High Performance Building Summit in Reno, NV in August, 2006 and presented a talk entitled "Intangible Benefits of Green Building." The EAM also worked closely with the Nevada State Office of Energy to develop regulations and rules to support AB3 and promote green building and energy conservation.

#### Pollution Prevention

Recycling continued to flourish this year under a \$30,000 grant from NDEP that started just as the new EAM began his tenure. The data from the recycling program is contained in section B, but the overall target this year was to expand and to start serving the residence halls, which never had a recycling program before. Through a combination of education and an incentive program (pizza for the groups that recycle the most), we developed and maintained a significant program in the residence halls. Credit for this should go to AJ Rogers (Recycling Coordinator) for his extensive efforts.

In an effort to demonstrate to the campus community an integrated picture of our utility use and waste production, we took the FY06 values for a number of utilities and waste production values and converted these data to per person per day assuming 250 working days and 20,000 people (student, staff and faculty). These numbers, while instructive, are more to serve as a baseline and to provide a first view of where we can look to target savings or reductions in our overall impact.

Within these numbers is the accepted limitation that not all people are here every day and not all people contribute to radioactive or chemical waste; at the same time, this reduction gives each of us a very real value of each of our share of the entire enterprise (see Table A6-1).

**Table A6-1** Campus Utility Use and Waste Production, per Person

Parameter	Amount	Unit	Cost
Electricity	11.3	kwh	\$1.23
Natural Gas	0.4	therm	\$0.46
Other Fuel	0.004	gallons	\$0.01
Water	34.5	gallons	\$0.07
Sewer	27.5	gallons	\$0.07
Trash	0.107	Cu ft	\$0.05
Radioactive Waste	0.0004	lbs	
Chemical Waste	0.0155	lbs	
Office Paper Recycling	0.08	lbs	
Glass, plastic, alum	0.01	lbs	
<b>Total</b>			<b>\$1.89</b>

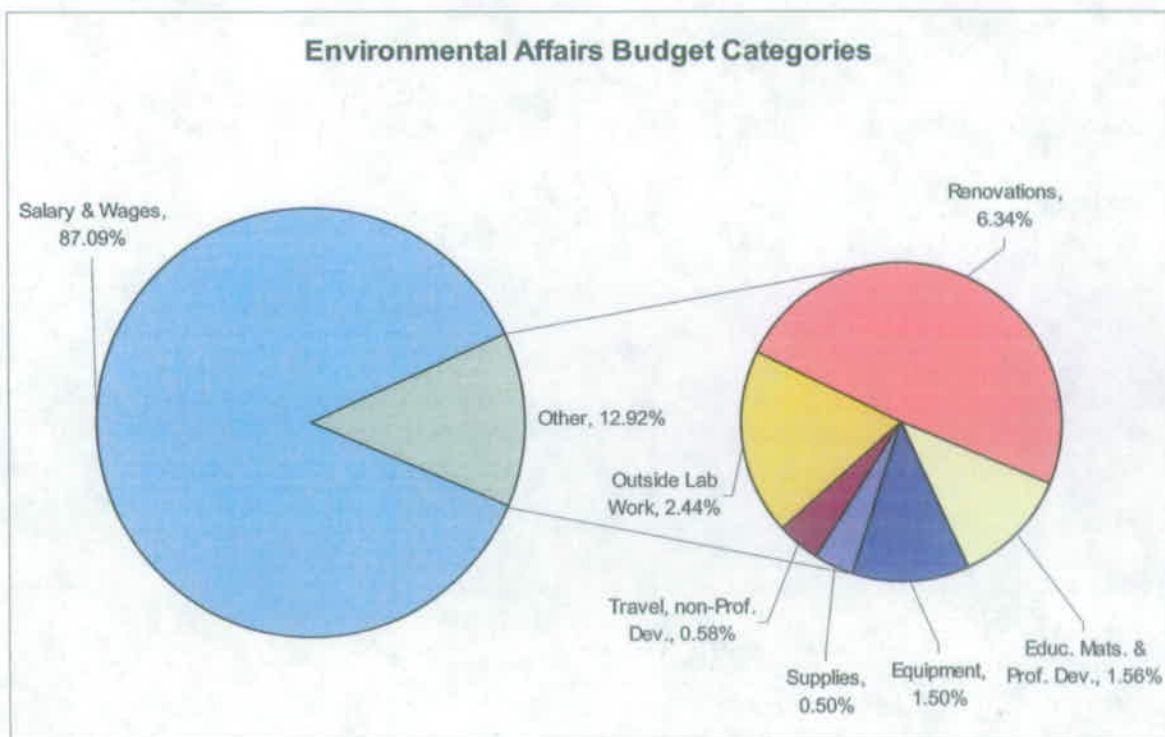
#### Budget Distribution

The majority of the Environmental Affairs budget is spent on Salary and Wages. Of the remainder, this year was an exception in that the Environmental Affairs Manager's office was remodeled which shows up as over 6% of this year's expenditures. The outside lab work category is very important for this function as that represents the sample analysis to support both our discharge permits and other analyses looking for environmental problems. The Equipment category this year was principally spent on equipment for sewer discharge monitoring.



**Table A6-2** Summary of Environmental Affairs Expenditures

Categories	%
Salary & Wages	87.09
Edu. Mat. & Prof. Dev.	1.56
Training	0.00
Computer Hardware	0.00
Computer Software	0.00
Equipment	1.50
Supplies	0.50
Travel non-Prof. Dev.	0.58
Outside Lab Work	2.44
Licenses	0.00
Contracts	0.00
Renovations	6.34
<b>Total</b>	<b>100.00</b>

**Figure A6-1** Environmental Affairs Expenditures

## A7. Air Quality/Ventilation

### Functional Role

The role of the industrial hygiene program at UNR is to provide a healthy environment for faculty, staff, students, and visitors by minimizing illness related to indoor air contaminants and exposure to physical agents. Potential indoor air contaminants in UNR facilities include volatile organic compounds, microbial agents, carbon monoxide, formaldehyde, pollen, environmental tobacco smoke, and other agents that may cause discomfort or illness. Adequate ventilation is the driving force behind good indoor air quality (IAQ). Poor ventilation can be due to a lack of general supply and/or fresh outside air, poor air distribution, unsatisfactory filtration, or insufficient exhaust capacity.

The industrial hygiene program defines policies and procedures that minimize exposures to air contaminants and provides a mechanism to address indoor air quality and ventilation concerns. Primary industrial hygiene functions include: evaluation of indoor air quality incidents, complaints, and potential exposures; development and implementation of the University indoor air quality and exhaust ventilation programs; exposure monitoring for chemical, biological, and physical hazards; employee/student training; and facility audits, inspections, and investigations.

### Goals and Objectives

Goals for 2006 included improved detection of campus indoor air quality (IAQ) problems through performance of additional proactive air quality assessments; development of an electronic database to store and retrieve exposure/indoor air quality data; and use of the campus wireless chemical detection system to perform laboratory air quality assessments.

Improvements to the indoor air quality program included performance of additional routine, proactive IAQ assessments. These

assessments were performed in 43 campus buildings and identified issues such as loose air handler fiberglass insulation, soiled coil drain pans, inadequate fresh outside air, and elevated indoor particulate levels. Due to information technology support limitations, a database for management of IAQ and exposure data was not developed. The EH&S Department is currently evaluating a third-party software solution for management of IAQ and exposure data. A wireless campus chemical detection system was utilized to collect real-time indoor air quality data during chemistry laboratory operations. Improvements were also made to wireless repeater locations to provide nearly complete campus coverage. Laboratory ventilation was assessed by completing annual laboratory hood surveys and verifying biological safety cabinet certification status.

### Activities

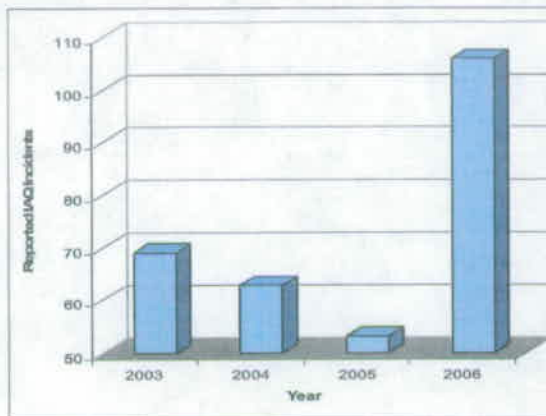
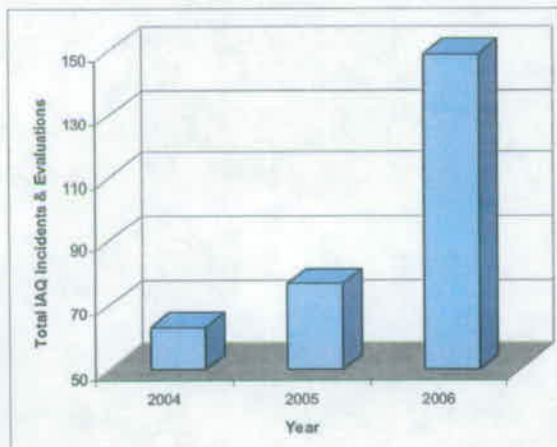
#### Indoor Air Quality Investigations

EH&S responds to incidents involving construction activities, odors, mold, and chemical spills that may adversely affect indoor air quality. EH&S also responds to reports of physical illness or malaise which may be the result of poor indoor air quality. In 2005, EH&S responded to a total of 53 air quality incidents. In 2006, EH&S responded to a total of 106 air quality incidents, collected 984 direct reading air quality measurements, and collected 60 integrated air samples. Incident responses and air sample collection activities increased by a factor of two in 2006 (see Figure A7-1).

Sampling for potential air contaminants is conducted using real-time direct reading instrumentation and integrated sampling methods. Sampling activities have increased dramatically, each year, for the last three years (see Figure A7-2).

#### Representative Exposure Reduction Activities

EH&S provides recommendations and oversight to reduce potential exposures during laboratory operations, construction/renovation

**Figure A7-1 Responses to Reported IAQ Incidents****Total IAQ Incident Responses & Proactive Evaluations**

projects, and other workplace activities. The following examples are representative 2006 EH&S industrial hygiene activities which resulted in substantial reduction of exposure to students, staff, and faculty.

Based on recommendations provided by EH&S, a new tissue processor and laboratory hood were installed in the **Nevada State Health Laboratory** histology lab. Additional exposure assessment was conducted to characterize effectiveness of these recommendations. Exposures to xylene during processor solvent change operations were reduced approximately six fold as compared to previous measurements

and were well below acceptable occupational exposure limits.

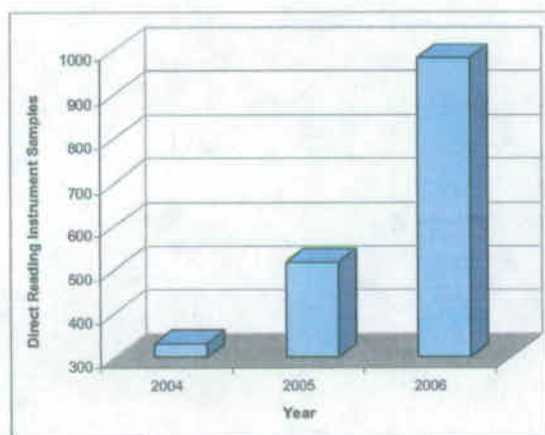
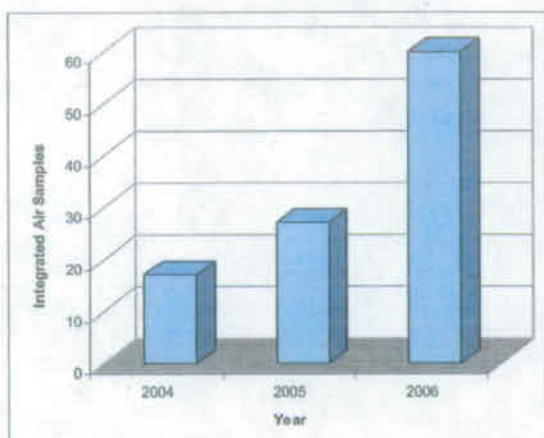
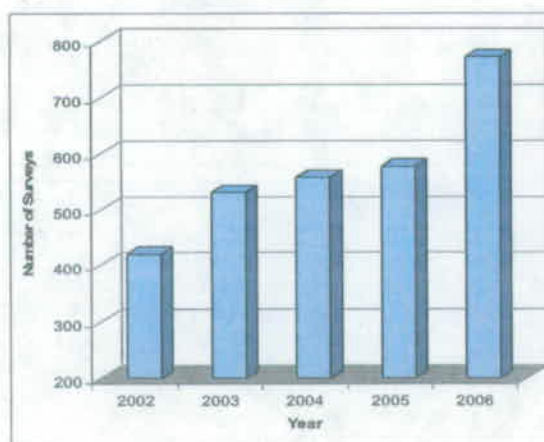
Assessment of dust exposures during sculpture classes in **Church Fine Arts** indicated exposures approaching the occupational exposure limit of  $1 \text{ mg/m}^3$ , expressed as an eight-hour time weighted average. Based on EH&S recommendations, a new dust collection system was installed which reduced dust exposures approximately three fold.

EH&S responded to multiple complaints of gas odors on the first floor of **Mackay Science**. Numerous gas leaks were discovered and repaired on most north wing floors and in the crawlspace. Although the odor was at times objectionable, natural gas levels did not approach hazardous levels. Nearly two months of investigation, sampling, and repair were necessary to reduce gas concentrations and alleviate complaints in this area.

#### Local Exhaust Hood Surveys

EH&S is responsible for assessing performance of all campus local exhaust hoods. EH&S completed 771 exhaust ventilation surveys for 434 laboratory hoods, 13 canopy hoods, and 9 task exhausts in 2006 (see Figure A7-3). Hood survey increases in 2006 were largely due to an effort to begin annual hood surveys earlier in the year. This should enable EH&S to perform multiple surveys on selected hoods during this next year. It is anticipated that the number of hoods and resulting surveys will continue to increase with student enrollment and additional research needs.



**Figure A7-2 Sampling Activities****Figure A7-3 Exhaust Ventilation Surveys****Budget Distribution**

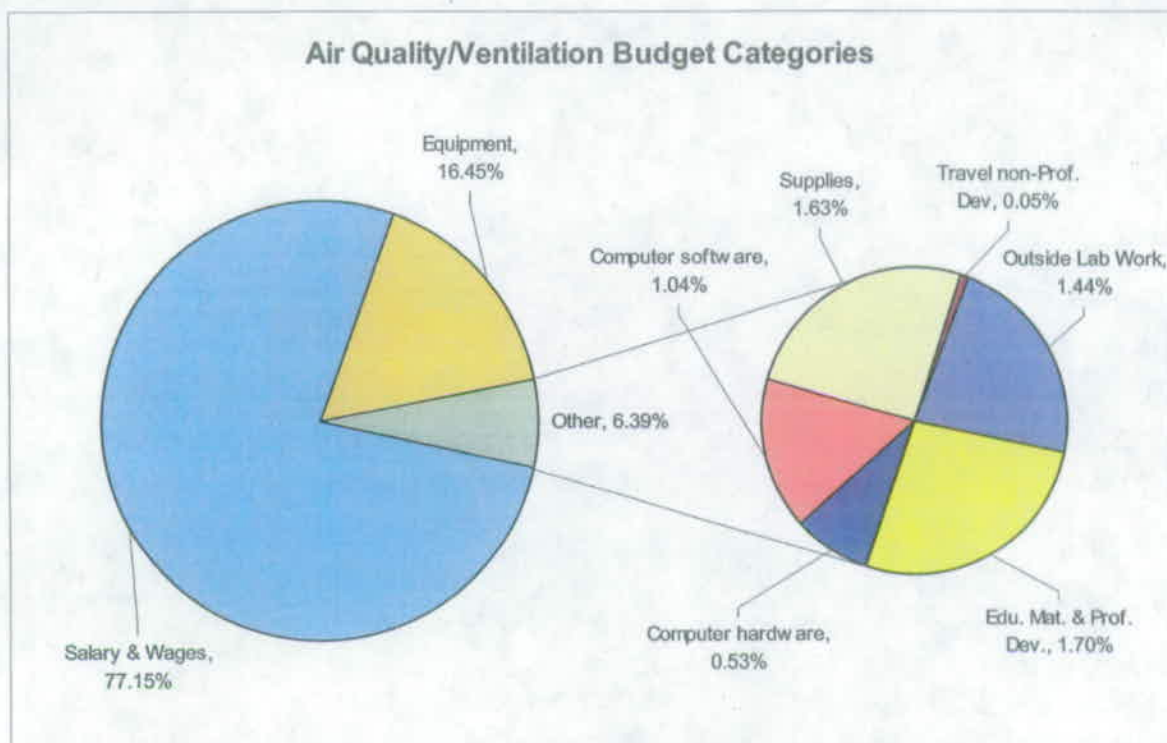
The majority of Air Quality/Ventilation expenditures was associated with salary and wages. Additional equipment expenditures were incurred to replace aging indoor air quality and ventilation equipment. Other expenditures included:

- Travel to Campus Environmental Health & Safety Management Association 2006 Conference for presentation and professional development
- Analytical fees for laboratory analysis of air and swipe samples
- Air quality and ventilation equipment calibration fees
- General supplies and phone charges

**Table A7-1 Summary of Air Quality/Ventilation Expenditures**

Categories	%
Salary & Wages	77.15
Edu. Mat. & Prof. Dev.	1.70
Training	0.00
Computer Hardware	0.53
Computer Software	1.04
Equipment	16.45
Supplies	1.63
Travel non-Prof. Dev.	0.05
Outside Lab Work	1.44
Licenses	0.00
Contracts	0.00
Renovations	0.00
<b>Total</b>	<b>100.00</b>

Figure A7-4 Air Quality/Ventilation Expenditures





## A8. Safety Training

### Functional Role

The focus of the EH&S Safety Training Program is support of EH&S through the administration of an effective, efficient and continually improving training program. The program provides resources to supervisors and employees for planning and conducting optimal workplace specific training. Services help departments and individuals determine their needs and establish a program that satisfies those needs through a wide range of options.

### Goals, Objectives, and Support Activities

Goals for 2006 included providing a high volume of regularly scheduled and special request training opportunities, offering resources to satisfy university training requirements, continuing development of an integrated management system that maintains effective and legal records/documentation, and investigation of an outreach strategy for off campus constituents. The functional goal of the EH&S Safety Training Section is to reduce or eliminate hazards through the development and support of a well-informed workforce, directly supporting the university values, goals and safety policy.

### Training Opportunities

Essential components of the training program are EH&S department presented classes. A portion of educational offerings took the form of workshops and seminars open to the campus on a scheduled basis and promoted on the Training Calendar of the department website. A larger portion of training activities were to fulfill special requests, provide consultation on and assistance with training program development, and provide referral to resources outside EH&S.

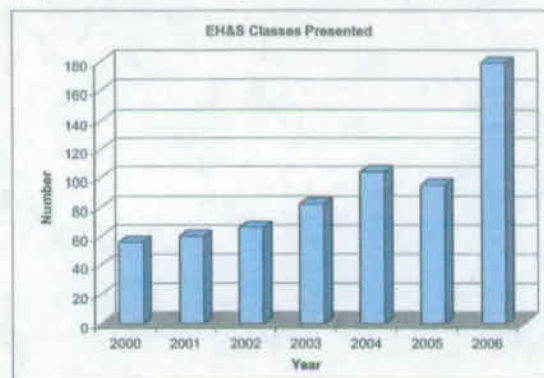
This past year was similar to the previous year in regard to the number of class participation by employees and the number of class presentations. There were 1650 total attendees in 2006, in 179 EH&S presented

classes, an increase in total sessions (Figures A8-1 and A8-2).

Figure A8-1 EH&S Training Attendees



Figure A8-2 Training Presentations by EH&S



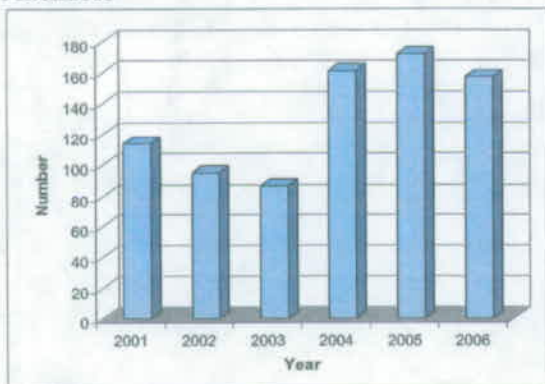
A special responsibility for training has been participation in the campus New Employee Orientation since the seminar began in 2001. In 2006, the program was expanded to accommodate professional as well as classified employees. The program introduced EH&S to new employees as well as provided an opportunity to become aware of mandatory trainings such as Hazard Communication, Emergency Preparedness, Fire Extinguishers, and Lab Safety. Attendee evaluations clearly indicate acceptance of safety as a core value and the EH&S department as a valuable resource.

The program is significant because exposing employees to the EH&S message early in their university careers builds good safety attitudes and spreads the safety culture. There were 157 employees who attended the program in 2006, a



positive factor in increasing awareness of EH&S programs. Since 2001, a total of 786 employees have attended the orientation, a significant portion of the total employee base and solid foundation for a desired safety culture.

**Figure A8-3 New Employee Orientation Attendees**



In 2006, the Fire Extinguisher Education Program was significantly improved with the acquisition of new training equipment. The workshop activities provided a new perspective and an increased level of interest, producing more effective training. New procedures were incorporated that took advantage of the lowered constraints to live practice, increasing the number of workshops.

**Figure A8-4 Student Participating in Hands-on Fire Extinguisher Training**



### Integrated Management System

A sophisticated system is required to manage the number and variety of classes

provided by EH&S and still maintain a superior level of performance. The critical function of providing credible and precise record keeping was accomplished by storing information in both hard copy and electronic format. Procedures made it possible for training sessions to be recreated from hard copy files with accuracy and reliability. The electronic database provided a quick reference of data when researching individual records. In 2006, the system documented 179 classes on 27 different topics promoted via the annual training calendar and by special request.

To improve training documentation and overall program management, a system was sought that would combine the accuracy of the hard copy records with the speed of the electronic database. Integration with other sections within EH&S and other training providers on campus was also seen as a desired system feature. To this end, EH&S joined a group developing a campus-wide platform called ESTER, for online registration of classes. As the initial step toward development of new distance learning programs, the system will improve accuracy of documentation and be user friendly. The program is already in use by some departments and after customization EH&S should be fully online by the end of 2007.

### Resources

A major emphasis of the training program and the Training Coordinator was to provide as many resources with as much accessibility as practicable to employees for mandated and requested training. Material resources for borrowers included an established safety video library, a reference library, "Train-the-Trainer" resources, and equipment and technical support.

The year saw a major increase in size of the Training Library with new videos, reference books and manuals, DVD, periodicals, and presentation support equipment. Materials were made available to the campus through the Video Loan Program, including the 216 safety videos, an increase of 41 videos or 23.4% from 2005. Material use was encouraged by an ease of use loan program that delivered videos through



campus mail with free microwave popcorn. Video viewing increased safety and regulatory compliance. Tracking video use by topic helped set priorities for new class development, purchase of new support materials, and to stay abreast of perceived safety concerns on campus.

### Outreach Program

During 2006 the Training Coordinator was part of a three person task force that investigated an outreach strategy for off campus constituents. The team identified 102 off-campus locations as possible service users. Primary contact personnel were identified for most locations along with a large number of volunteers. It is estimated that 20% or more of the University's total number of employees may be employed at off-campus locations.

The task force identified services that will need to be provided to off-campus locations and employees, many of the services fall into the category of training. Methods of service delivery and requirements of EH&S resources were also specified. The project is currently on hold, though it will probably be revisited in the foreseeable future.

### Department & University Support

Beyond special project goals for the year, the training program contributed to the success of the University effort through a variety of activities. Increased recognition of the EH&S program was accomplished with display presentations at events such as Staff Employees Council (SEC) Open House. These events represent high profile exposure for the department and promotion of safety on campus and in the community.

There was additional exposure from participating in a number of community activities such as the Point of Impact child safety seat program and the youth bicycle safety program. Both programs are sponsored and funded by the National Safe Kids Program and participation was as a certified technician volunteer.



Additional support to the EH&S program included participation in evacuation drills associated with department/building emergency plans on campus and off, including the annual residence hall fire drills held at the beginning of the semester and fire extinguisher training for all the Residence Hall Staff and Assistants.

Service to the University included serving on two Faculty Senate Committees, the Bylaws and Code Committee and the Administrative Faculty Personnel Policies and Procedures Committee.

### Special Activities

Extensive time and effort was dedicated in support of the campus wide taskforce created to develop a proposal for reform of the administrative faculty evaluation process. The Training Coordinator represented EH&S and was a contributing participant of the taskforce and sub-committees. The proposal was submitted and given the authorization to complete development for campus-wide use during the next evaluation period.

Another commitment of the Training Section is serving as the center of activities in support of the EH&S Jim Randolph Memorial Scholarship. The section has continued as a major advocate, participant and contributor in advancing the scholarship. Recipients are selected by the University Scholarship Office from undergraduates in Environmental Science and Health disciplines. This year the third \$500 scholarship award went to Alyson Armstrong, a sophomore majoring in Health Ecology with a 3.709 GPA. Fundraising efforts have totaled \$4,500 providing three annual scholarship

awards. The remaining \$3,000 is in a Foundation account to work toward the goal of reaching an endowment level of \$10,000.

### Budget Distribution

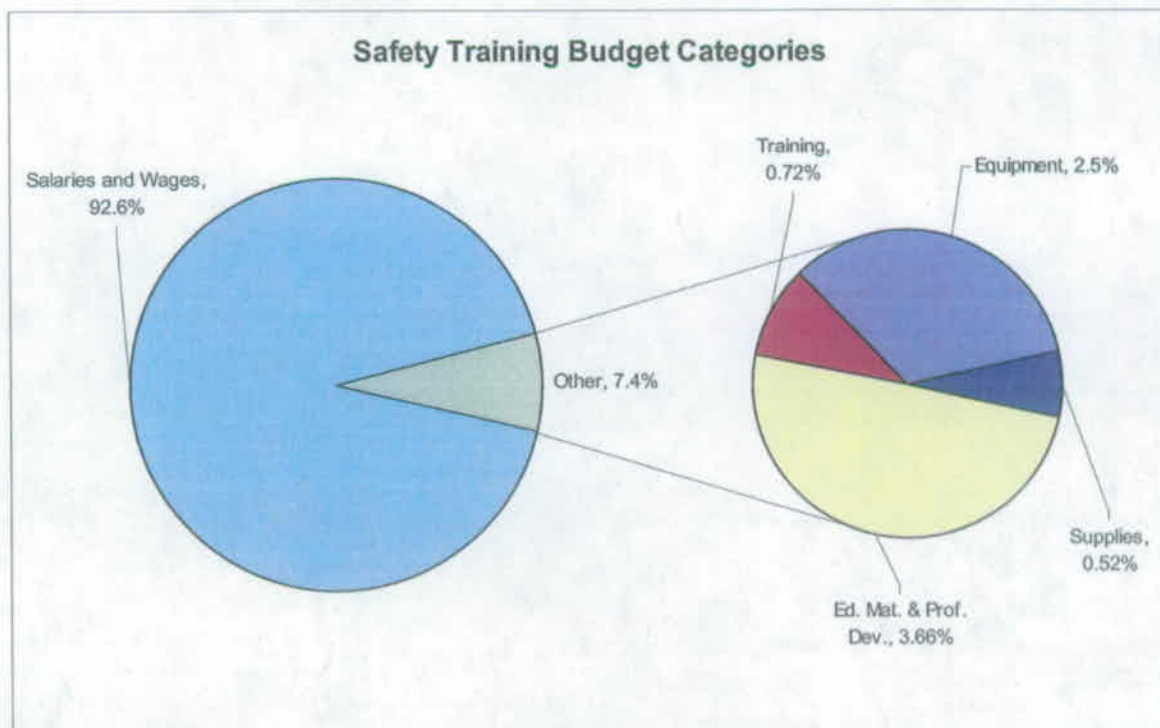
Salaries and wages for the Training Coordinator and student employees were by far the largest expenditures for the training section. Other expenditures included routine and reoccurring cost for:

- Safety videos
- Subscriptions to quarterly updated safety training resources
- CPR/AED certification fees for department members

**Table A8-1** Summary of Training Safety Expenditures

Categories	%
Salary & Wages	92.6
Edu. Mat. & Prof. Dev.	3.66
Training	0.72
Computer Hardware	0.00
Computer Software	0.00
Equipment	2.50
Supplies	0.52
Travel non-Prof. Dev.	0.00
Outside Lab Work	0.00
Licenses	0.00
Contracts	0.00
Renovations	0.00
<b>Total</b>	<b>100.00</b>

**Figure A8-4** Safety Training Expenditures





## A9. Knowledge Management

### Functional Role

The role of the Knowledge Management program (KMP) is to support growing EH&S business activities by effectively implementing knowledge management process and strategy in collecting and distributing information related to environmental protection and health risk reduction. Getting the right information at the right time in planning and decision-making is essential in supporting the mission and purposes of the department.

### Goals and Objectives

Specific goals of the Knowledge Management program included applying scientific knowledge and advanced engineering technology to environmental risk and safety problems concerned with regulatory compliance, improving the usability and usefulness of environmental health resources and information, and assisting EH&S regulatory compliance activities including environmental monitoring and samplings of air, water and soil.

The following is a list of major tasks accomplished in 2006.

- Walk-in hood VOCs emission and performance improvement project.
- Editing and formatting a comprehensive EH&S annual report including program reports, environmental reports and appendices, and publication of an annual report in both electronic and print formats.
- Design and development of a new EH&S web site to effectively deliver information and improve user interface for easy use.
- Presentation of applications developed in support of EH&S business activities.
- Campus-wide doorcard project to provide a quick and easy reference for emergency responders, faculty, employees and students who enter in campus laboratories.

The KMP service will continue to enhance knowledge management techniques, provide ongoing support, and facilitate systematic approaches to identify and help remedy potential environmental problems.

### Activities

#### Walk-in Hood VOC Emission and Performance Improvement

A pilot study to assess Volatile Organic Chemical (VOC) emissions and performance improvement of a walk-in hood was conducted in Annex 2. On July 13, 2006, old activated carbon filters were replaced with new filters, and dirty particulate filters were also exchanged before starting a pilot study. In addition, calibrations for each VOC sensor were performed using zero gas and span gas (isobutylene) periodically.

KMP provided the VOC emission monitoring efforts for 17 times monitoring events and recorded/analyzed adsorption efficiencies over time to track filter performance (see Table A9-1). Face velocity was measured and found to be a reasonable result in the recommended range (80 ~ 120 fpm).

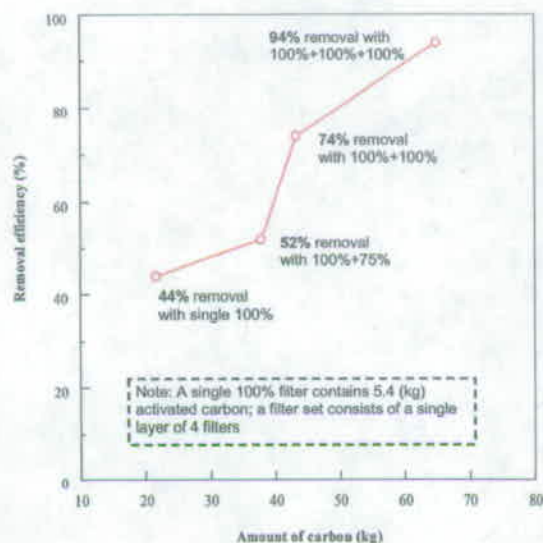
**Table A9-1** Summary of Walk-in Hood Monitoring Activities in 2006

Date	% Removal
January 13	59.6
February 3	61.9
February 24	60.2
March 10	53.1
March 24	54.8
April 28	54.2
May 19	50.5
July 13*	94.3
July 25*	91.3
July 27*	88.1
August 15*	90.1
August 24*	84.4
September 8*	81.8
September 29*	78.6
October 20*	73.8
November 17*	74.9
December 8*	73.4

\* denotes VOC removal efficiency with 3 layers of carbon filters

A pilot study showed that combining three layers of 100% filter sets (carbon volume) provided the best removal efficiency of 94% under test condition. Combining two layers of 100% filter sets showed the second best result of 74%. A single 100% carbon filter set showed the lowest removal efficiency of 44%. This year, the walk-in hood performance improvement project was very successful. More research will be conducted to assess cost and optimum operation associated with VOC treatment in 2007 (see Appendix App.3-1).

**Figure A9-1 VOC Adsorption Efficiencies**



### 2005 EH&S Annual Report

KMP edited and formatted the 2005 annual report which can facilitate continued improvement and communicate EH&S business activities and accomplishments. Furthermore, KMP redesigned various different types of graphs and tables for a consistent format.

KMP prepared a special project report regarding the VOC emission monitoring and performance of a walk-in hood. In addition, KM prepared air quality and wastewater monitoring reports due to a partial year vacancy of Environmental Affairs Manager (EAM) position.

EH&S distributed copies of the annual report to related institutes and other universities. Hopefully, the EH&S annual report serves as a topical reference regarding the status of department efforts.

**Figure A9-2 2005 Annual Report Cover Page**



### New EH&S Web Site Development

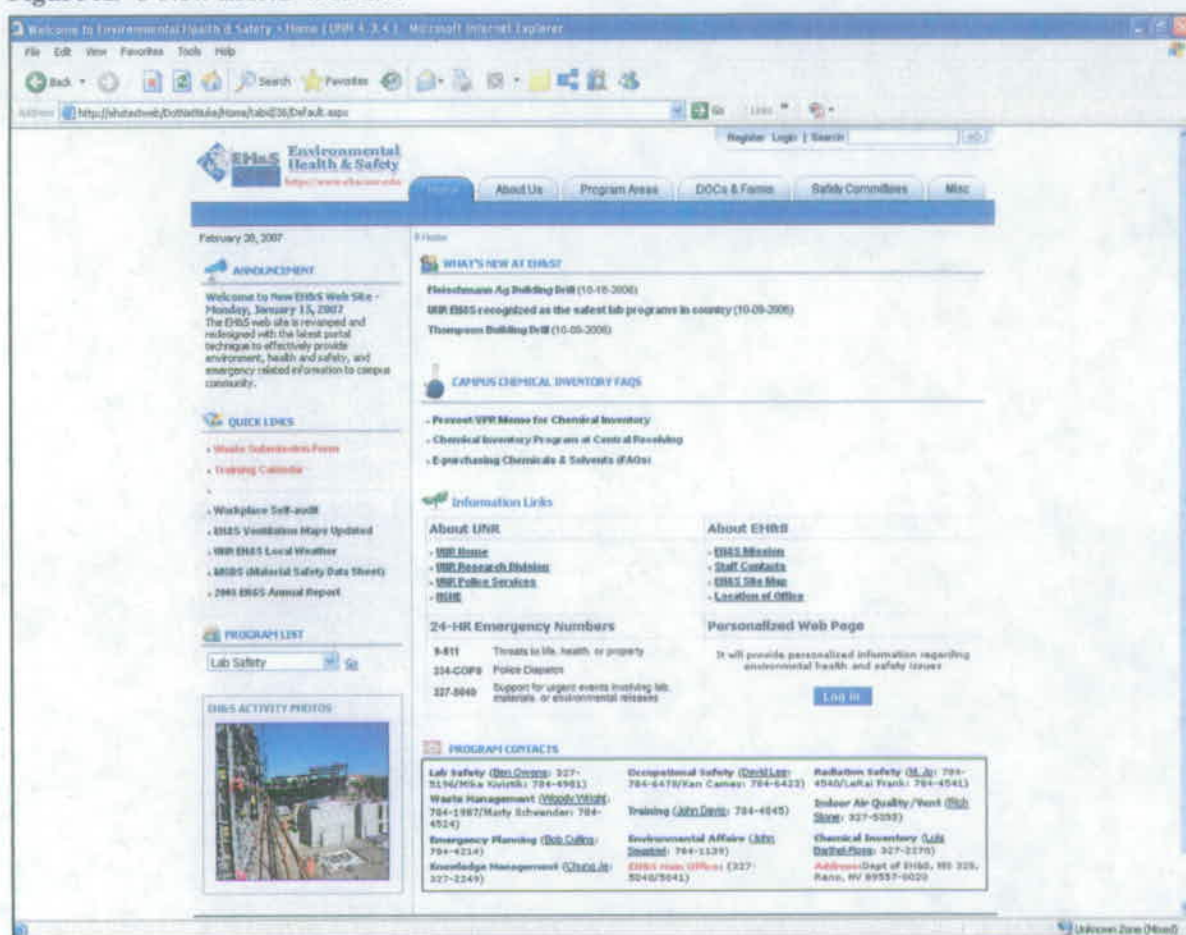
Redesign of the EH&S web site was conducted to effectively deliver information related to environment, health, safety and emergency planning to the campus community. The new web site is totally redesigned and reformatted to provide easy navigation and user-friendly interface.

DotNetNuke platform and database were successfully installed on the test web server. The page layout was redesigned using a commercial skin package. A XMOD tool was used to create the "EH&S What's New" page.

KMP gave a demo to get feedback from the EH&S staff for the new website being developed. More than 90% of the project was completed and the new EH&S web site is expected to be launched in early 2007.



Figure A9-3 New EH&amp;S Web Site



### Campus-wide Doorcard Project

The doorcard was designed to be a valuable tool for emergency responders, faculty, employees and students who enter campus laboratories. It provides a quick and easy reference for safety personnel in the event of an emergency.

The 2005 doorcard was modified based on suggestions and comments from staff. The latest doorcard is shown in Figure A9-4. Emergency contact information was collected by visiting each laboratory. Information was then entered into the EH&S Integrated Data Management System (IDMS) database. This allowed the doorcards for each laboratory to be automatically produced using room-specific information. NFPA rating numbers were

calculated and displayed on the doorcard based on criteria developed by EH&S.

This year, extensive progress was made on the campus-wide doorcard project, visiting about 130 labs in 6 buildings and explaining the purpose of the doorcard & the information displayed. The doorcard project was a very successful and it will be continued to complete the rest buildings in 2007.


### Presentation of Information

During the year, 2 research papers were prepared and submitted to environmental journals and are under review for possible publication. In addition to research papers, EH&S research activities were presented at 2 environmental related conferences, US-China



special monitoring workshop held in Beijing, China, and 2 seminars in Korea.

**Figure A9-4** Sample Doorcard with NFPA Rating Numbers

<b>LABORATORY</b>			
Room: <b>1</b>			
Building: <b>APPLIED RESEARCH FACILITY, ANNEX 4</b> (Bldg. No. 092)			
Department: <b>Environmental Health &amp; Safety</b>			
Primary Contact:		Alternate Contact:	
<b>MYUNG-CHUL JO</b>		<b>LERA FRANK</b>	
Office Phone:	Alt. Phone:	Office Phone:	Alt. Phone:
(775) 784-1234	(775) 123-4567	(775) 784-5678	(775) 456-7890
UNC Environmental Health & Safety: 327-5040 (24 hour contact)		Police Dispatch: 334-2677 (24 hour non-emergency)	
Fire, Medical, or Police Emergency: 9-911			

Log printed on 7/28/2006 12:02:00 AM

**Table A9-2** Summary of Knowledge Management Expenditures

Categories	%
Salary & Wages	99.18
Edu. Mat. & Prof. Dev.	0.41
Training	0.00
Computer Hardware	0.00
Computer Software	0.22
Equipment	0.00
Supplies	0.19
Travel non-Prof. Dev.	0.00
Outside Lab Work	0.00
Licenses	0.00
Contracts	0.00
Renovations	0.00
<b>Total</b>	<b>100.00</b>

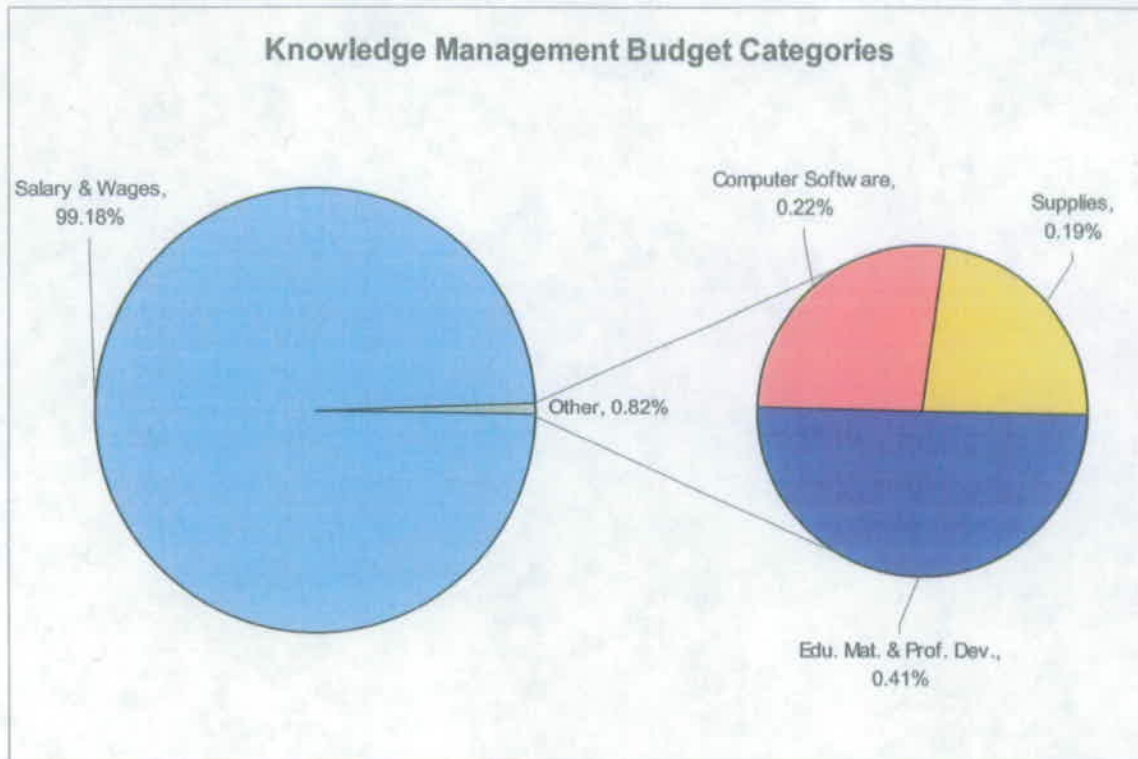
### Budget Distribution

The majority of the Knowledge Management budget was associated with salary and wages (see Table A9-2 and Figure A9-5).

Other expenditures included:

- Travel to the annual conference of the Global Convention of Ethnic Korean Scientists and Engineers (GCSE) for presentation.
- General supplies and phone charges.
- Software purchase for developing a new EH&S website.

Figure A9-5 Knowledge Management Expenditures



## A10. Administrative Support and Incident Reports

### Overview

The Administrative Support and Office Management section of EH&S consists of one Administrative Assistant III and one Administrative Assistant II position. The support and office management staff set goals last year. The Administrative Assistant III and II continued to work on the goals throughout the year by monitoring the objectives which had been set within each goal category.

### Goals

“Creation of a productive and cohesive main office to better serve EH&S & the University,” was a goal set for 2005. The management support staff is one of the main focal points for the EH&S office and in order for the department to run smoothly the office needed to work together as a team. One of the main objectives within this goal was to improve communication between the office management by conducting meetings at least monthly and this objective was achieved. The administrative support staff frequently discussed items of concern between monthly meetings and this enabled them to adjust their work load and responsibilities, as needed.

After reviewing the monthly activity reports the administrative support staff noted increased activities which occurred at the beginning and the end of the fiscal year.

### Activities

#### Financial Management

Throughout the year it was the responsibility of the administrative support staff to maintain accurate EH&S account balances, update expenditure records and to reconcile various budget issues.

Some minor adjustments were necessary for reconciling credit card transactions, which were

submitted twice a month. Student payroll and the on-call PR-29 payroll forms were also completed and delivered to payroll on or before the prescribed dates set by the university.

During the ending and beginning of the fiscal year the administrative support staff set budget lines and initiated budget transfers, placed orders for new equipment and supplies, and prepared BPOs and POs. Some adjustments in workload schedules were necessary to accommodate the additional activities during these peak periods.

Conference and workshop requests for traveling faculty, staff and students were completed in sufficient time to secure the best rates available. Travel requests and claims were delivered to the Travel Department within the deadlines set by the University.

#### Personnel Records Management

An objective for the administrative staff during the year was to maintain accurate leave and personnel records. By securing leave slips prior to annual leave and by completing sick leave slips by the end of the affected week, the quarterly and annual reports due to the VPR and Accounting Offices were completed on schedule. The administrative support staff shared in the responsibility of attending university training sessions and acquired necessary information regarding administrative procedural changes within the university management systems.

#### File Management

The objective of maintaining accurate records and files within the department is conducted on a daily bases. Several hours were spent purging and archiving the EH&S Director's files and office files throughout the summer months.

Incident calls were received and logged in a database and the yearly report was generated from that information. Quarterly reports were also generated for the Director and staff. MSDS reports received by the EH&S office were entered into a database on a regular basis.



### Office Reception

Daily coverage for the main office regarding reception duties was coordinated between the administrative support staff for the work day. Main office reception duties included sorting mail, receiving packages, answering the telephone, assisting faculty, staff and students with various requests, and proof-reading reports. Without additional support for telephone coverage the administrative staff is often unable to attend university meetings at the same time. A new goal or objective for the next year may be to obtain the assistance of a student worker on a part time basis.

### Advisory Committee Support

“Administrative support for the specialty safety advisory committees” was another specific goal set by the administrative support staff. Preparing agendas, minutes and securing conference rooms were typical duties performed. The objective of determining the time frame for forwarding minutes to the Chairs of the committees and the EH&S *ex officio* members was reviewed in 2006. It was determined the objective was met as the administrative staff adjusted their workload to accommodate the committees needs.

### University Governance and Support

The Administrative Assistant II was an elected representative on the Staff Employees' Council and served as a member of several campus governance committees. Notable contributions to the Facility Resource Committee led to the formal appointment of an EH&S representative as a regular committee member.

### ARF Occupant Support

“Overseeing the Applied Research Facility Building Management” objective was assigned to the EH&S administrative support staff several years ago. Prior to that time a support person was responsible for building occupants' mail, packages and keys. The administrative support staff assists the Director of EH&S, who is also

the Director of the Applied Research Facility, by providing the occupants of the building with services that included submission of work orders, scheduling of conference rooms, and communication with Parking and Transportation Services. It should be noted that approximately seventeen different departments within the building have at least one office/laboratory in the ARF building and many laboratories have student employees.

Package deliveries for building occupants are received twice daily at the EH&S department office. The main office has limited space for packages and the hallway often has to be used to hold packages until they are picked up by their owners. Chemical packages have aroused safety and security concerns that must be resolved. The administrative support staff will work with the Director, Chemical Inventory Coordinator and Central Receiving in 2007 to determine a more appropriate way for managing chemical deliveries to the ARF Building.

The administrative support staff monitors occupant key requests with a database and reports are generated for departments on a yearly basis. This form of tracking has helped to improve the safety and protection of research assets and personnel. The current University Key Control Policy will be followed by the administrative support staff until policies and procedures are changed. A card lock system has been installed on the exterior doors of the ARF building. Once this system is fully functional, all occupants of the ARF building will have to secure new cards for entrance into the building. This will eliminate the need to secure keys when occupants vacate the building.

Space management within the ARF building has required that the administrative support staff work closely with the Director of ARF, the VPR and the Vice Provost. The administrative support staff is aware of room vacancies when they occur and the appropriate administrators are notified. These observations have been especially useful to the Facility Resource Committee. The administrative support staff will continue to assist the Director and the occupants of the ARF Building in 2007.

Budget Distribution

The Administrative Support and Office Management section consists of the Director and two Administrative Assistant positions. The salary figures in the budget summary include all three positions.

Various departmental operating costs are included in the Administrative Support and Office Management section, such as adding new telephone lines, institutional memberships and subscriptions, faculty/staff business cards, door name tags, etc. Other general operating expenses that would be considered common costs are the main department copier which is included in the Contracts category, the department fax machine and other telephone expenses included in the Equipment category, and monthly postage and vehicle gasoline/repairs which are included in the Supplies category. Interview expenses for candidates applying for an administrative faculty position that was filled in 2006 are included in the Travel, Non-Professional Development category.

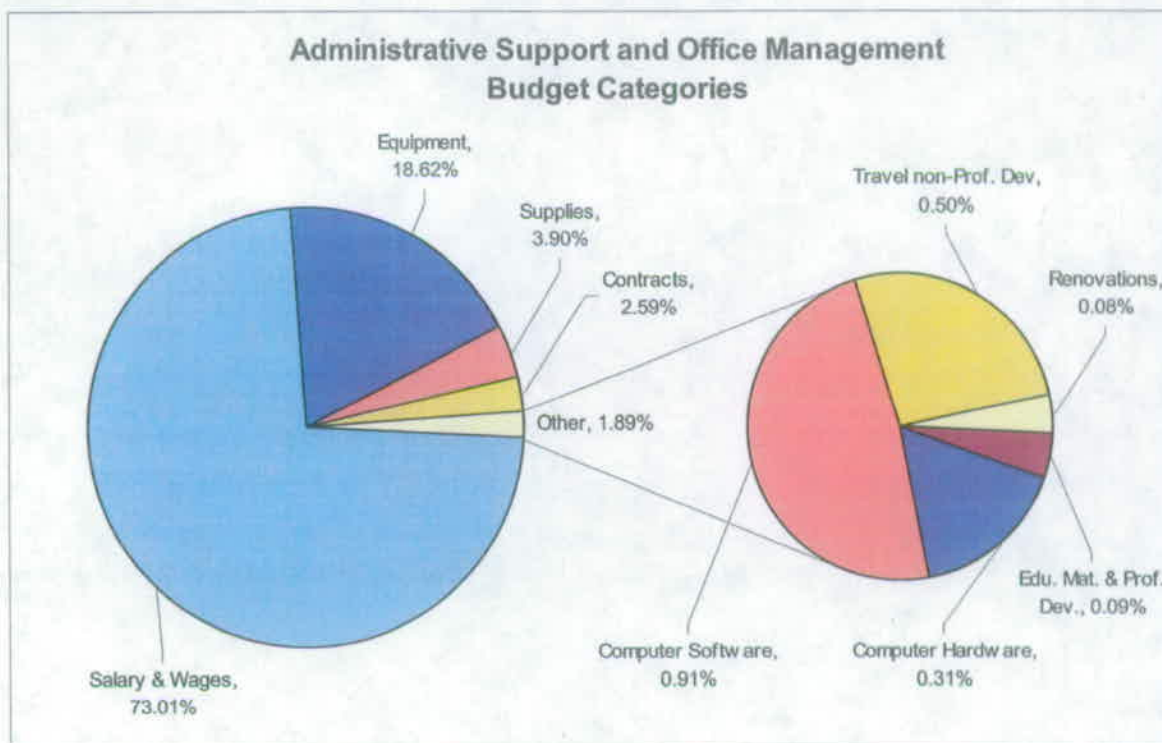
General office supplies are ordered on an on-going basis (pencils, paper, post-its) and are available to all faculty/staff and students from the main office. Office supplies that were ordered specifically for one of the other sections are included in the budget summaries of the applicable sections.

Expenditures for equipment were abnormally high in 2006 since three vehicles were purchased to support new programs or as replacements for older vehicles.

**Table A10-1** Summary of Administrative Support and Office Management Expenditures

Categories	%
Salary & Wages	73.01
Edu. Mat. & Prof. Dev.	0.09
Training	0.00
Computer Hardware	0.31
Computer Software	0.91
Equipment	18.62
Supplies	3.90
Travel non-Prof. Dev.	0.50
Outside Lab Work	0.00
Licenses	0.00
Contracts	2.59
Renovations	0.08
<b>Total</b>	<b>100.00</b>

**Figure A10-1** Administrative Support and Office Management Expenditures





## Incident Reports Summary

During the year 2006 it was noted that the Environmental Health and Safety Department received more calls for urgent assistance than in 2005; but since EH&S staff have direct phone lines and cell phones they can be contacted without going through the main office. The Department receives calls from both on-campus and off-campus locations in Reno and Las Vegas, including leased facilities, UNR field stations, farms and mines.

Emergency calls received by the office staff during business hours are recorded on a special form and the incident is referred to the appropriate staff member(s) for response. The EH&S staff responds to calls involving air quality issues, chemical spills, odor, radiation, human exposure, environmental releases and other incidents.

When calls are reported to the main office the office staff categorizes the incident; however, upon response the EH&S responder may recategorize the event or discover a secondary type of incident. Something referred to as a "mold" issue by the caller, for example, may turn into an "air quality" issue after the first inspection.

Periodically calls are referred to 911 dispatch, University Police Services, Reno Fire Department or UNR Buildings and Grounds.

Outside of normal business hours, the main department telephone line is forwarded to a cell phone carried by an on-call EH&S staff member.

The Incident Report log began in 2001 and was revised in 2005 to include health effect notations. All reports are entered by the Administrative Assistant II into a database for easy information retrieval. The form will continue to be revised as opportunities for improvement are recognized.

Table A10-2 is a summary of the incident calls received over the last six years. Incident calls are initially assigned a single category type; however, incidents may be assigned additional

category types upon response. Table A10-2 reflects incident types as initially categorized and does not account for re-categorization or additional category types assigned upon response.

In 2006, 176 incidents were reported to EH&S; a 57% increase over 2005 and the most reported incidents since tracking began in 2001. The majority of the incidents (55%) were directly classified as an air quality issue; however, there were an additional 6 incidents that involved mold issues in indoor environments. The more accurate accounting of indoor air quality incidents is the total of these two categories, or 59% of all reported incidents.

Figure A10-2 illustrates the location and nature of incidents reported in 2006. Almost half (48%) of the incidents occurred in buildings with a large number of teaching and research laboratories. The fact that hazardous materials are used in these buildings provides a partial explanation since many of the incident report categories relate directly or indirectly to these materials. Non-laboratory buildings accounted for 40% of the reported incidents, presumably resulting from more traditional office-type indoor air quality issues.

Specific indoor air quality issues in Cain Hall and Mackay Science were notable in 2006. A water valve break in Cain Hall resulted in significant water damage in southeast wing of Cain Hall. Recommendations were made for removal of damaged construction materials, including sheetrock & insulation materials in much of the affected areas. Daily moisture and humidity measurements were conducted to evaluate effectiveness of drying. Routine air sampling for airborne asbestos and mold was also conducted to evaluate effectiveness of remediation in these areas. In Mackay Science, numerous gas leaks were discovered in the north wing. Nearly two months of investigation, sampling and repair were necessary to reduce gas concentrations and alleviate complaints in this area. It should also be noted that 12% of the reported incidents involved facilities located off of the UNR main campus, including the Desert

Research Institute and Truckee Meadows Community College.

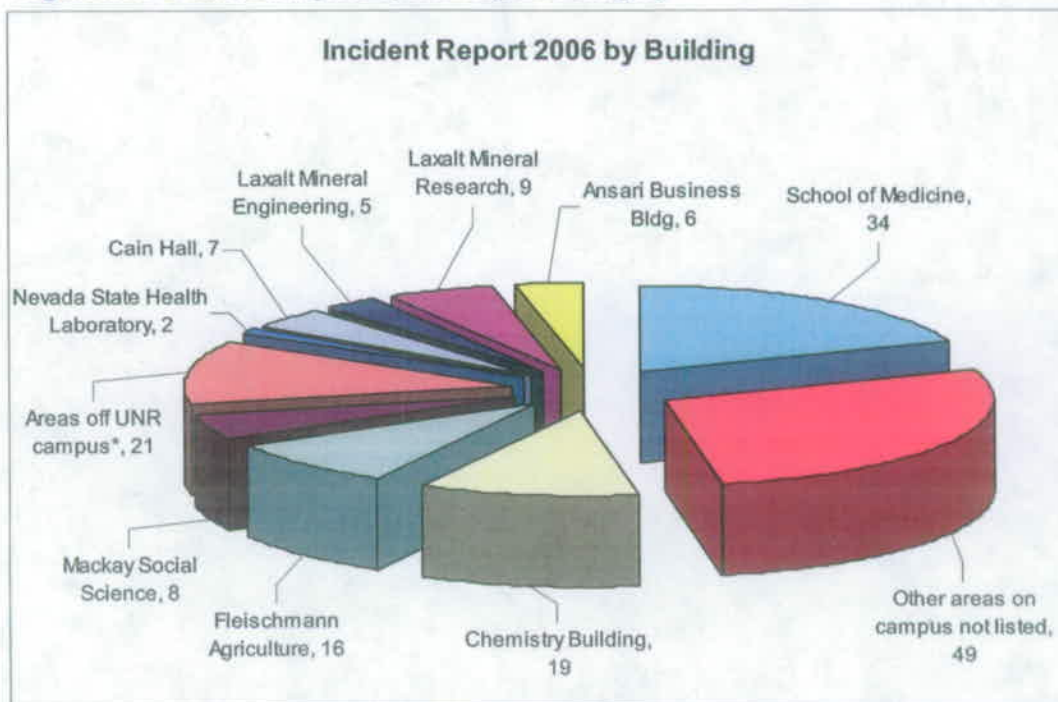
Figure A10-3 indicates that the vast majority of incidents are reported during normal business hours (8:00 a.m. to 5:00 p.m. on business days).

The number of incidents reported after hours in 2006 (12) was the highest since tracking was initiated. This may be due to air quality incidents related to early morning construction activities (diesel exhaust) associated with the Knowledge Center and Student Union buildings.

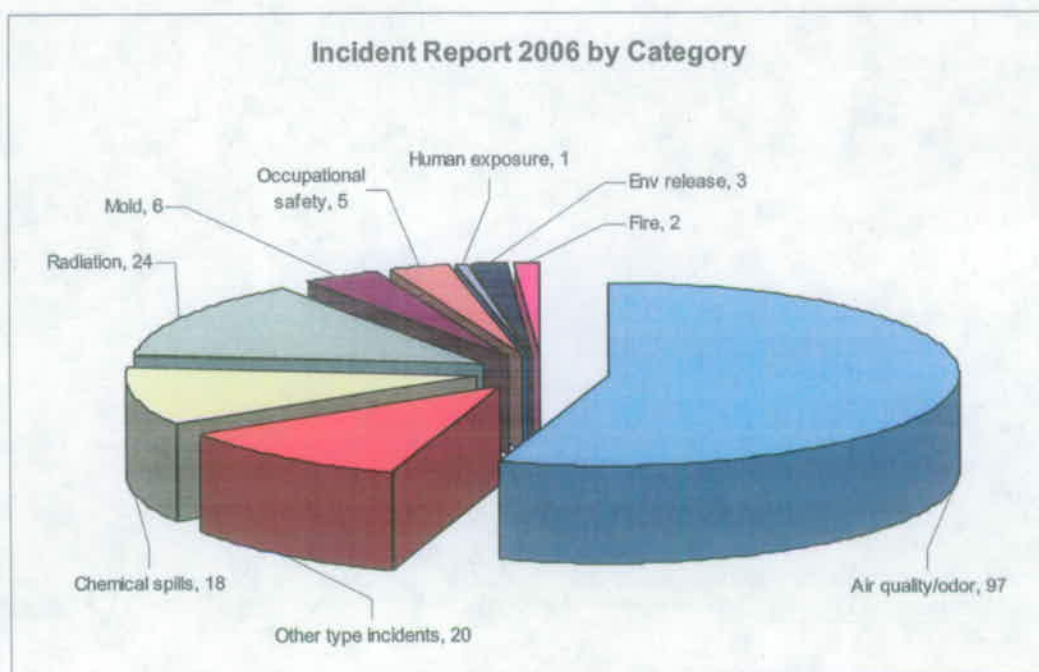
**Table A10-2** Summary of Incident Reports by Type

Type of Incidents	2001	2002	2003	2004	2005	2006
Air quality/odor	56	65	54	58	48	97
Other type incidents	16	19	18	16	16	20
Chemical spills	11	14	15	15	14	18
Radiation	1	0	2	15	15	24
Mold	10	15	4	11	4	6
Occupational safety	8	2	2	8	3	5
Fire	2	0	0	3	1	2
Human exposure	1	4	1	2	4	1
Health effects	-	-	-	-	3	0
Environmental release	-	-	-	-	4	3
Total	105	119	96	128	112	176

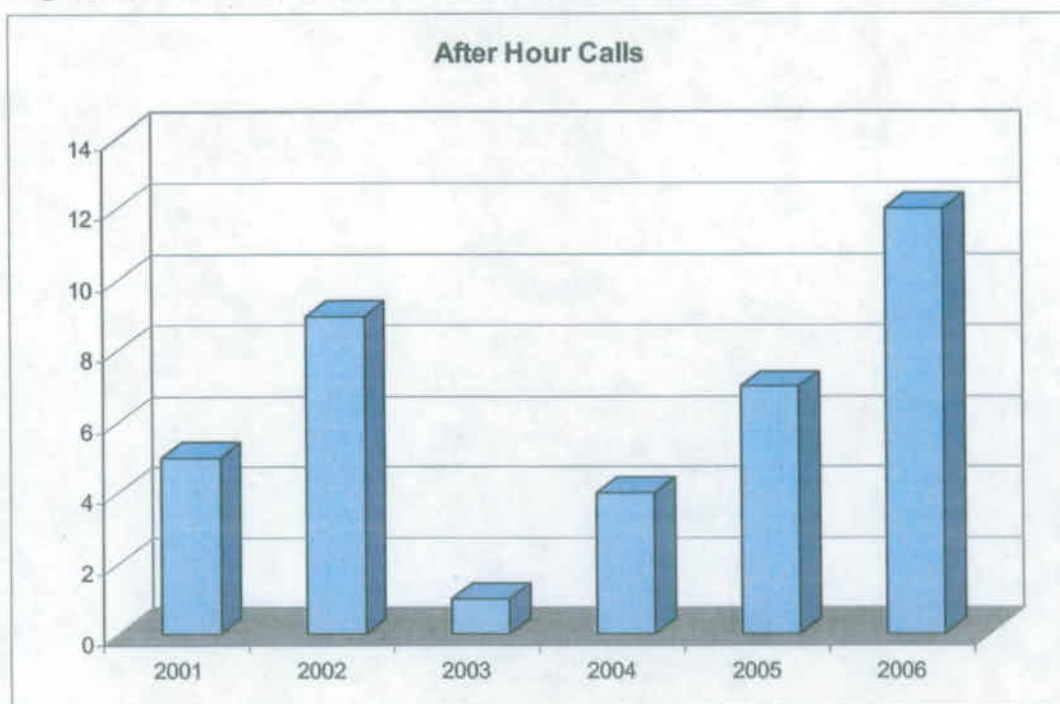
**Figure A10-2** Incident Reports by Building and Category



\*: includes Desert Research Institute, Truckee Meadows Community College, Nevada Terawatt Facility and rental properties



**Figure A10-3 Summary of After Hour Calls over the Past 6 Years**





## **B. Environmental Data Report**

1. Hazardous Waste
2. Recycling Activities
3. Asbestos
4. Gamma Radiation Background
5. Wastewater Monitoring
6. Air Quality

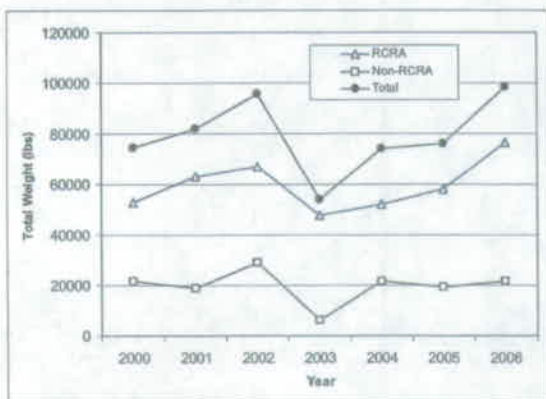
## B1. Hazardous Waste

### Chemical Waste

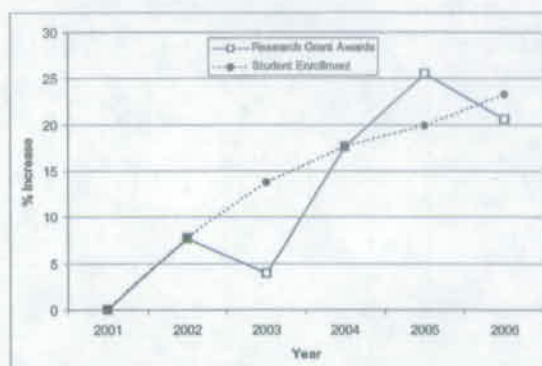
UNR is considered a "Large Quantity Generator" (LQG) by the U.S. Environmental Protection Agency (EPA), producing more than 2,200 lbs of hazardous waste in a given month. As such, EH&S must maintain a hazardous waste facility to safely store and process chemical wastes for shipment to off-site disposal facilities while complying with strict federal and state regulations. Chemical waste generated from more than 250 locations on the UNR campus is brought to the EH&S facility where it is consolidated (bulk liquids or solids) into 55 gallon drums or lab packed (individual containers) in drums based on hazard class and Department of Transportation (DOT) guidelines.

The UNR Hazardous Waste Facility has undergone several expansions and renovations over the years to increase safety, security and productivity, but it is relatively small given the large amount of chemical waste generated annually (Figure B1-1). Waste volumes have fluctuated since 2000 but have been steadily on the rise for the past four years (2003-2006). This increase is in line with UNR's growth in two critical areas, student enrollment and research dollars (Figure B1-2), which influence the quantity of waste generated due to additional classes, laboratories, and research.

**Figure B1-1 Annual Chemical Waste Disposal Totals, 2000-2006**



**Figure B1-2 Growth Indicators**



### Biological Waste

Biohazardous waste includes waste materials derived from cultures and stocks of infectious agents, recombinant DNA, human pathological wastes, contaminated animal carcasses and body parts, all sharps, and human blood and blood products. At UNR, biohazardous wastes are produced by teaching and research laboratories, medical clinics, and athletics. A local waste contractor (Reno Disposal) picks up sharps and solid biohazardous waste directly from campus clinical and athletic facilities, while EH&S picks up sharps containers from laboratories for staging prior to pickup by the contractor. The contractor transports the waste to its facility where it is autoclaved and then disposed of at the local landfill.

Laboratories autoclave all other solid biohazardous waste themselves and then dispose of the waste as ordinary solid waste. Disposal of human pathological waste is coordinated by the School of Medicine Gross Anatomy Laboratory, with cremation by local mortuaries. Disposal of animal carcasses and body parts contaminated with infectious agents is coordinated by Laboratory Animal Care Services, with disposal by incineration through a licensed contractor.

Liquid biohazardous waste is treated by chemical disinfectant or autoclaving by the generating laboratory prior to disposal. Human blood is treated in this manner or is disposed of directly to the sewer via sinks (which is allowed by regulation).

EH&S facilitates the safe collection and handling of biohazardous waste by supplying campus workplaces with sharps containers and autoclavable biohazardous waste bags at no charge.

### Radioactive Waste

Low level radioactive wastes are generated as a result of radioactive materials use in University laboratories and field studies. The wastes are collected, segregated, packaged, and shipped to licensed waste disposal facilities by Radiation Safety (RS) staff. The waste shipping documents are maintained indefinitely at the EH&S Department. RS staff members prepare waste shipments, make arrangements for waste transportation, and submit reports to all appropriate authorities regarding the waste transportation and eventual disposal.

Waste with short radioactive decay half-life is segregated and held for decay at UNR. Regulations require holding waste for decay for a time period equal to 10 radioactive half-lives. The waste may then be discarded as non-radioactive waste if there are no hazardous materials, components or characteristics, and no radiation levels above natural background.

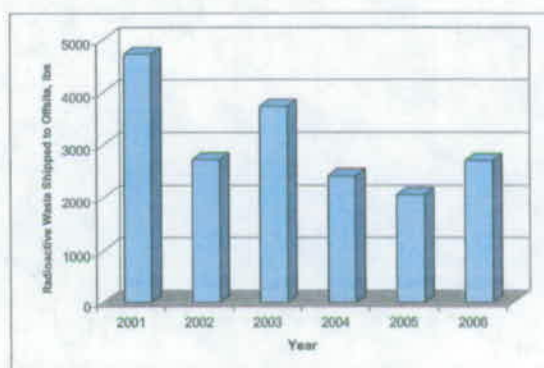


All the supplies associated with radioactive waste management are provided by RS staff to ensure that there is no confusion in research

laboratories between ordinary trash and low level radioactive waste.

There were 284 laboratory radioactive waste pickups during 2006. Total waste shipped to off campus sites for disposal was 2,692 lbs. The amount of waste decayed on site was 260 lbs of dry solid and 147 liters of liquid during 2006 (Figure B1-3).

**Figure B1-3** Radioactive Waste Disposal, Excluding Waste Held for On-site Decay





## B2. Recycling Activities

2006 marked the third year of collaborative effort between EH&S and the recycling program at the University of Nevada, Reno. After a successful first few years, the program was poised to grow. The program is a team effort between EH&S, the Nevada Department of Environmental Protection (NDEP), Facilities Services, and the Associated Students of the University of Nevada (ASUN). In March 2006, ASUN received notice of a \$30,000 grant from the NDEP, and that grant was assigned to EH&S for administration and implementation. That grant began on July 1, 2006 and provided some key impetus to move the program forward.

The main focus of the program is the common recyclable containers made of glass, plastic and aluminum. In addition, the program takes on special requests for materials such as steel or larger items that need special handling. The program also collects toner cartridges and ink cartridges from printers and returns these for refilling and resale. This is even better than recycling, as it is reuse. The program continued to use space in the Pilot Plant of the ARF for staging and sorting of materials and is assigned a full sized pickup truck from EH&S for transport of recyclable materials in addition to the ASUN cart. EH&S also provides supervision from the EAM and assistance in purchasing, financial tracking and other measures from the EH&S staff. The support the program got from all these groups allowed it to flourish in 2006.

The program itself is run by students. The program began the year with a part-time coordinator and a part-time student assistant. Shortly after the new EAM started, the coordinator left and since there were no funds (EH&S funded the program for some months in 2006), we continued with just an assistant, who also did the data collection. Once the new grant monies were available, we began the process of expanding the program. AJ Rogers, the new recycling coordinator made the decision, based on research from other campuses, to target the residence halls since they were thought to have

the most potential for growth. A new recycling assistant (Erin Szelagowski) was hired in August to implement the residence hall program and she has now become the new recycling coordinator with AJ's departure in January 2007. We note here the significant increase in recycling activity associated with the hiring of the assistant. At the same time, the program expanded the number of bins in department offices and other high traffic areas of campus from around 30 to over 100. The main efforts, however, went into working closely with Residential Life to get the recycling program accepted by, and implemented in, the Residence Halls. Part of the residence hall program was an aggressive data collection effort where we monitored the materials (by weight) from each floor of each residence hall. This allowed us to compute a recycling rate (lb/person) for each floor and award a pizza party (paid by the funds we got from the aluminum cans) for the floor that recycled the most per person. This award had the unforeseen consequence of floors raiding other floors' bins and taking recyclable materials out and putting it in their own bins. We take this as a good sign of the awareness of the program, if not exactly in the spirit of what we set out to accomplish. This has been remedied.

The program also began building an identity by developing a logo (Figure B2-1) as well as getting some publicity for the program through the student newspaper, the *Sagebrush*.

Figure B2-1. Recycling Logo



The main results from the 2006 recycling efforts are presented in Table B2-1 and Figure B2-2. Table B2-1 presents the monthly breakdown of collected materials in addition to the totals for the year. Over the year, the program collected over 27,000 pounds of materials with more than half the weight coming from plastic. Figure B2-2 shows the monthly totals for all materials, along with the results from 2005. This figure dramatically depicts the increase in amount of materials collected with the launch of the residence hall program in the fall semester, and at the same time it shows the very significant growth of the program from 2005 to 2006. Overall, we collected more than 3.5 times the weight of material in 2006, but that is a low figure for the direction of the program since the last four months averaged almost 6 times the material collected compared to a year earlier.

Other materials not included in these tables, includes the 447,700 lbs of office paper removed for recycling by Waste Management under an agreement that has been on-going for over 12 years.

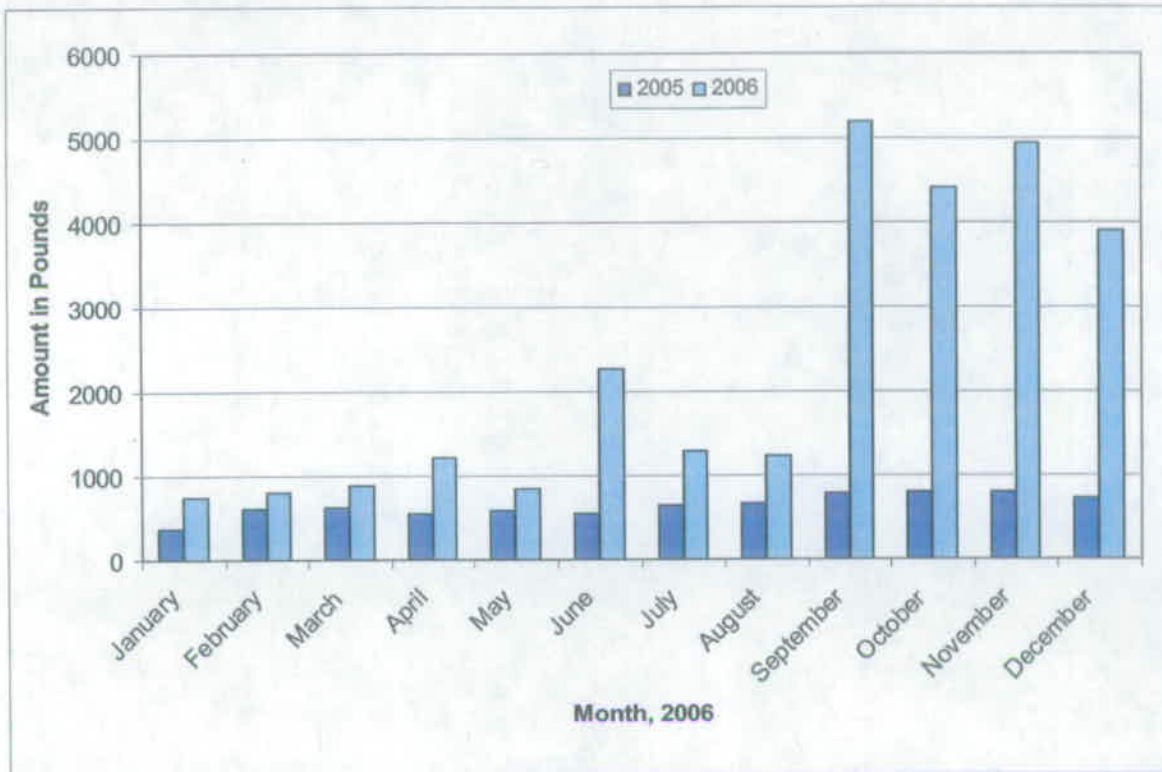
**Table B2-1** Summary of 2006 Recycling Activities

Month	Total Recyclables (lbs)	Aluminum (lbs)	Plastic (lbs)	Glass (lbs)	Other <sup>1</sup> (lbs)
January	750	65	460	225	0
February	800	30	530	240	0
March	875	37	576	263	0
April	1,223	108	575	420	120
May	834	91	475	200	68
June	2,270	82	565	168	1,455
July	1,290	92	550	240	408
August	1,236	72	575	225	364
September	5,198	277	3,084	1,477	360
October	4,418	345	2,463	1,593	17
November	4,936	357	2,575	1,757	247
December	3,896	288	2,350	1,258	0
<b>Total</b>	<b>27,725</b>	<b>1,844</b>	<b>14,777</b>	<b>8,066</b>	<b>3,039</b>

<sup>1</sup>Other: Includes special pickups of paper, plastic, steel, electronics, etc



**Figure B2-2 2005 and 2006 Monthly Recycling Totals**



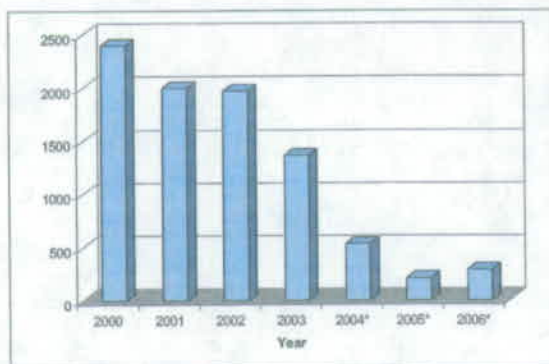


### B3. Asbestos

**B**oth federal and state regulations require the sampling and analysis of all building materials that may be disturbed by remodeling or renovation projects for the presence of asbestos. Samples must be collected by a licensed inspector. EPA and OSHA regulations require that a minimum numbers of samples be collected based upon the actual area of disturbance. To meet these obligations, EH&S performed asbestos sampling, record establishment and maintenance responsibilities for the University until late in 2003, when Buildings & Grounds personnel also started to collect asbestos samples. As a result of an inter-departmental agreement in 2004, Buildings and Grounds (B&G) assumed all asbestos sample collection responsibilities. EH&S retained responsibility for oversight and maintenance of the asbestos management policy including responsibility for asbestos survey recordkeeping.

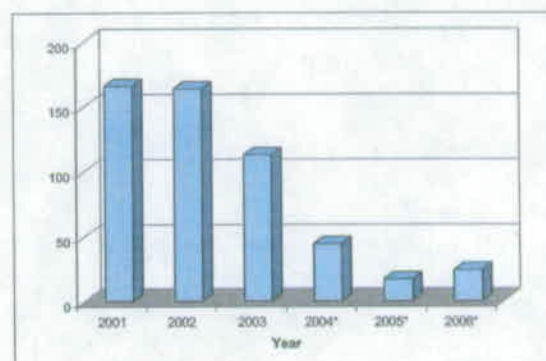
From 2000 through 2002, EH&S personnel collected an average of 2118 asbestos samples per year as shown in Figure B3-1. In 2003, the number of asbestos samples dropped to 1361; a number greater than 3 standard deviations from the previous annual average. That number dropped again in 2004, to 527 asbestos samples. In 2005, the number of samples collected dropped to 204, 10% of the annual average number of samples collected prior to 2003. In 2006, a total of 282 collected samples were reported to EH&S, 13% of the EH&S average prior to 2003.

**Figure B3-1** Number of Asbestos Samples per Year



Prior to 2003, EH&S personnel were collected an average of 176 asbestos samples per month (see Figure B3-2). In 2003, the average number of samples per month dropped to 113. In 2004, the number of samples per month dropped to 44. In 2005, once again the average number of samples per month dropped to a new low, 17. This number of samples is less than 10% of the monthly average number of samples collected by EH&S prior to 2003. In 2006 an average of 24 samples/month were collected, 13% of EH&S' monthly average prior to 2003.

**Figure B3-2** Annual Asbestos Survey Summary



\* EH&S no longer collecting samples

## B4. Gamma Radiation Background

Natural background gamma radiation levels on the UNR campus have been monitored since 1999. Electret ion chambers are used to measure gamma radiation. The chambers are placed in five different locations across the UNR campus where they are continuously exposed to the outdoor natural radiation environment. Readings are taken bi-annually and averaged over the monitoring period. Regulations do not require monitoring of natural background radiation, but these data are required to distinguish radiation worker exposures resulting from licensed radiation use from natural background radiation.

Background monitoring results are used as references for radiation surveys of radiation use facilities and surveys of incoming radioactive materials to the UNR campus (Figure B4-1 and Table B4-1). The monitoring results are shared with the UNR campus community, regulators, interested parties, and the public. The information would also be valuable during radiological incidents.

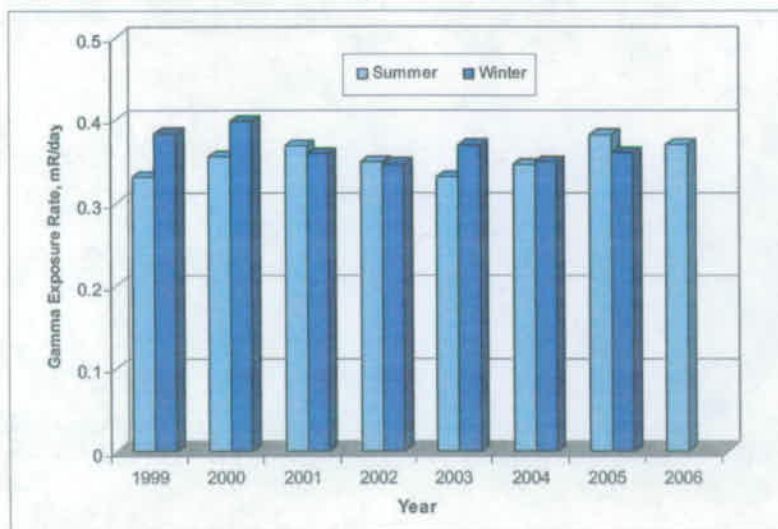
Gamma background level during the summer of 2005 (April-September 2005) was the highest among all summer measurements since 1999. Due to atmospheric conditions,

seasonal variances in gamma background levels are expected but there are no obvious patterns based on the data. Radiation levels tend to show a bit higher during winter months than during summer months (Figure B4-1).

**Table B4-1** Background Monitoring Results

1999	Summer	0.331, mR/day
	Winter	0.384
2000	Summer	0.356
	Winter	0.399
2001	Summer	0.369
	Winter	0.359
2002	Summer	0.350
	Winter	0.347
2003	Summer	0.332
	Winter	0.370
2004	Summer	0.346
	Winter	0.350
2005	Summer	0.382
	Winter	0.361
2006	Summer	0.371
	Winter	

**Figure B4-1** Summary of Background Monitoring over 8 Years





## B5. Wastewater Monitoring

All wastewater leaving campus laboratory buildings is tested on a frequent basis to ensure compliance with National Pollutant Discharge Elimination System (NPDES) limits as administered through Reno Municipal Code, Section 12.16.580, Limitations on Wastewater Strength. There are 7 points on campus where wastewater effluent is sampled twice a year to ensure compliance with discharge limits. A copy of the Environment Control Permit with its requirements may be viewed at <http://www.ehs.unr.edu> by selecting the Environmental Affairs Program and then the appropriate building. The sampling points include:

- Fleischman Agriculture (FA)
- Laxalt Mineral Research Center (LMR)
- Laxalt Mineral Engineering (LME)
- Harry Reid Environmental Laboratory (HREL)
- Chemistry Building (CHEM)
- Medical School (multiple building complex) (MED)
- Applied Research Facility (ARF)
- Nevada State Public Health Laboratory (NSPHL)

The University also maintains permits with less stringent sampling requirements for the following buildings.

- Applied Research Facility (ARF)
- Jot Travis Student Union (JTSU)
- Church Fine Arts (CFA)
- Maintenance Building #69 (Twilight)
- B&G Maintenance Building (Evans)
- Scrugham Engineering/Mines (SEM)
- Leifson Physics (LP)

An effluent discharge sample is collected at each location on a biannual basis by the Environmental Affairs Manager (EAM) and submitted to a Nevada Certified laboratory for analysis. Sample results are submitted to the City of Reno to demonstrate compliance with discharge permits. All sample results for 2006 were in compliance. These results are presented in Tables B5-1 and B5-2.

In addition, City of Reno Environmental Staff collected samples at the Laxalt Mineral Engineering (LME) building and the Harry Reid Environmental Laboratory (HREL) on June 19 and August 8, 2006 respectively. Both samples were in full compliance.

**Table B5-1** Results of Sewer Sampling, May 2006 (unit: mg/l)

	NSHL	MED	CHEM	HREL	LME	LMR	FA
Oil & Grease	<5.0	<5.0	<5.0	<5.0	58	<5.0	<5.0
pH	7.8	7.6	7.9	7.9	6.8	7.9	6.3
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	0.11	0.014	<0.01	0.023	0.014	0.055	0.064
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.016
Nickel	<0.01	<0.01	<0.01	0.016	<0.01	<0.01	<0.01
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1



**Table B5-2** Results of Sewer Sampling,  
November, 2006 (unit: mg/l)

	NSHL	MED	CHEM	HREL	LME	LMR	FA
pH	8.1	8.8	8.1	7.0	7.0	7.5	6.8
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel	<0.01	<0.01	0.012	0.013	<0.01	<0.01	<0.01
Copper	0.061	0.012	0.014	0.070	0.019	0.017	0.034
Zinc	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	<0.005	<0.005	<0.005	0.0059	<0.005	<0.005	0.0051

## B6. Air Quality

The University maintains four (4) air quality permits through the Washoe County District Health Department - Air Quality Management Division (WCAQMD):

- B01933A - Central Heat Plant
- A02-0069 - Internal Combustion Generators
- A04-0001 - Large Animal Carcass Incinerator
- B01487A - Laboratory Hoods

### Central Heat Plant, Facilities Services

The Central Heat Plant operates the campus boilers, which produce high temperature water that is pumped all over campus to heat buildings and water. The Heat Plant is also the command center for the computer system that keeps most campus heating and cooling systems on-line and on schedule. There are four (4) primary boilers that have the capability of operating off of either diesel or natural gas (see Table B6-1).

**Table B6-1 Fuel Consumption on Campus for 2006**

	Diesel Fuel (gallons)	Natural Gas (therms)
Jan-06	791.4	304,821.0
Feb-06	1608.5	319,988.0
Mar-06	1078.7	334,613.0
Apr-06	1246.4	233,583.0
May-06	723	94,886.0
Jun-06	119.6	41,134.0
Jul-06	0	25,655.0
Aug-06	791.6	27,405.0
Sep-06	1,671.0	61,298.0
Oct-06	334.1	132,682.0
Nov-06	55.4	267,088.0
Dec-06	315.1	346,265.0
<b>Total</b>	<b>8734.8</b>	<b>2,189,418.0</b>
<b>Avg.</b>	<b>727.9</b>	<b>182,451.5</b>

### Internal Combustion Generators, Facilities Services

The University has 37 electrical generators located on campus to serve as emergency power backup for buildings. One generator was added in 2006 for the new computer servers in the Central Services building. The generators are only operated during a power outage or during routine checks to ensure they are in proper working order (see Table B6-2).

### Large Animal Incinerator

The large animal incinerator which is located at the University's Main Station Field Laboratory was not operational during 2006. Incineration services, when needed, were obtained commercially.

### Laboratory Hoods

All main campus laboratory hoods are included in a single air discharge permit issued by the Washoe County District Health Department - Air Quality Management Division (WCAQMD). The permit specifically covers emission of EPA-defined Hazardous Air Pollutants and volatile chemicals as defined by certain physical properties and inventory quantities.

Under terms of a consent agreement signed in 2004, the University quantified total hood emissions for calendar year 2006 (the actual emission year runs November 1, 2005 to October 31, 2006). Since instrumental monitoring of hundreds of hoods would be physically impossible, emissions were calculated using a materials balance equation.

Chemical inventory data have vastly improved since EH&S added a dedicated chemical inventory function in the Lab Safety section of the department. Accurate tracking of incoming chemicals, however, was lacking since purchasing procedures and records were managed in other administrative units of the

university. The lack of complete chemical purchasing data resulted in UNR implementing a requirement to use an electronic purchasing program in February 2006. The early data from the e-Purchasing program did not appear to be sufficient to complete the mass balance. In August, 2006, a new program was implemented where EH&S personnel (initially from the Chemical Inventory team and with a new hire) would intercept packages at Central Services and inventory them there. This program was very successful and enabled us to collect data for the mass balance.

In December 2006, we submitted a report that consisted of 826 hazardous air pollutants (HAPS) and volatile organic compounds (VOC), and an additional three reports of photographic chemicals (7), calibration standards (45), and laboratory synthesized chemicals (195) for a total of 1073 compounds. For each of these compounds, we reported the two inventories, the purchasing data and the waste data to calculate the mass balance. Two important points came out of the data in this report. First, for the incoming chemicals we were able to compare the sums from the Central Services inventory and the e-Purchasing program, and found that the inventory process accounted for about twice as many chemicals (by mass) as did the e-Purchasing program. The second finding was that within the limits of the approach, UNR emits approximately 20,000 pounds of laboratory chemicals. Of this total, approximately 4,700 lbs were HAPS, which is about 9% of the 50,000 lb threshold for HAPS that would put us in a higher emissions category.

Washoe County accepted the report and issued the university a renewed permit in early January 2007.

### **Carbon Dioxide Emissions**

There is increasing concern over the potential of various greenhouse gas emissions to contribute to global warming. In the interest of establishing a baseline for these emissions, we present here the major carbon dioxide (CO<sub>2</sub>) emissions from various sources at UNR. The

main sources are the central heat plant and the electricity we use. UNR used 59.6 million kilowatt hours of electricity in 2006. Sierra Pacific Power publishes emission rates for CO<sub>2</sub> from the mix of electricity sources that contribute to its power grid. This value is 1.486 pounds CO<sub>2</sub> per kWh. In addition, the 2.2 million therms of natural gas and the 8,700 gallons of fuel oil contribute to our CO<sub>2</sub> emissions. Totalling these, we get a 2006 emission of approximately 114.4 million pounds of CO<sub>2</sub> from these UNR operations. This of course excludes all the transportation fuels used by the UNR vehicles and the fuel used by UNR faculty, staff and students getting to and from campus. One issue we want to address in 2007 is the environmental impact of UNR's transportation use.



Table B6-2 Generators for Power Backup of Buildings

Building	B/G Num. Designation	Location	Fuel Type	Tank Cap.(gal)	KW	Voltage	Current (Amps)
Mack Social Sciences	1	west exterior	gasoline	25	15	480	18
Sarah Fleischmann	2	north exterior	gasoline	25	9.4	208	26
Lombardi Recreation	3	basement boiler room	natural gas	0	30	480	36
Parking Garage	4	under N entry ramp	unknown	400	150	480	180
Cain Hall	5	cooling tower	gasoline	25	10	208	28
College of Education	6	2nd Fl elec. room	diesel	200	80	480	96
Mackay Mines	7	S. end CHP	diesel	200	150	480	180
Central Heat Plan	8	N end interior	diesel	20	180	480	217
Leifson Physics	9	4th Fl	natural gas	0	55	480	66
Nye Hall	10	basement	diesel	500	135	208	375
Argenta Hall	11	NW exterior	unknown	unknown	550	480	829
Canada Hall	12	north exterior	diesel	500	25	480	30
Manzanita Hall	13	east exterior	diesel	200	75	208	208
University Inn	14	North Exterior	diesel	75	75	208	208
Getchell Library	15	basement	diesel	100	125	480	150
School of Medicine	16	NE corner ext	diesel	20	150	480	180
Laxalt Mineral Engineering	17	Between LME/LMR	diesel	40	75	480	90
Seismology (LMR)	18	Between LME/LMR	unknown	unknown	25	480	30
Custodial Bldg	19	west exterior	gasoline	20	11	208	31
Lawlor Events Center	20	Main Elec Room	diesel	50	150	480	180
JTU/Dining Commons	21	east exterior	diesel	200	45	208	125
Reynolds Journalism	22	electrical room	diesel	200	125	208	347
William Peccole Park	23	North of Park	Diesel				
Computing Center	24	north exterior	gasoline	500	440	480	529
Nevada Health Lab	25	West exterior	unknown	unknown	275	480	400
Trailer (yellow #1)	26		unknown	unknown	15	480/208	23/55
Church Fine Arts	27	north exterior	diesel	100	75	480	90
Morrill Hall	28	basement	diesel	25	6	208	180
Sage Bldg Stead	29	West dock	diesel	150	150	480	180
LMR	30	S Exterior	diesel	500	150	480	180
Continuing Education	31	west exterior	natural gas	0	75	480	90
Fleischmann Ag #1	32	west exterior	natural gas	0	10	208	28
Fleischmann Ag #2	33	west exterior	natural gas	0	100	208	278
Trailer (white)	34		unknown		20	480/208	30/60
Trailer (yellow #2)	35		unknown		230	480/208	345/800
Trailer (brown)	36		unknown		100	480/208	150/347
Central Services	37	E exterior	Diesel	500	375	208	1301

# Appendices

## **App.1 EH&S Organization Chart**

## **App.2 Safety Committees Organization Chart**

## **App.3 Special Projects**

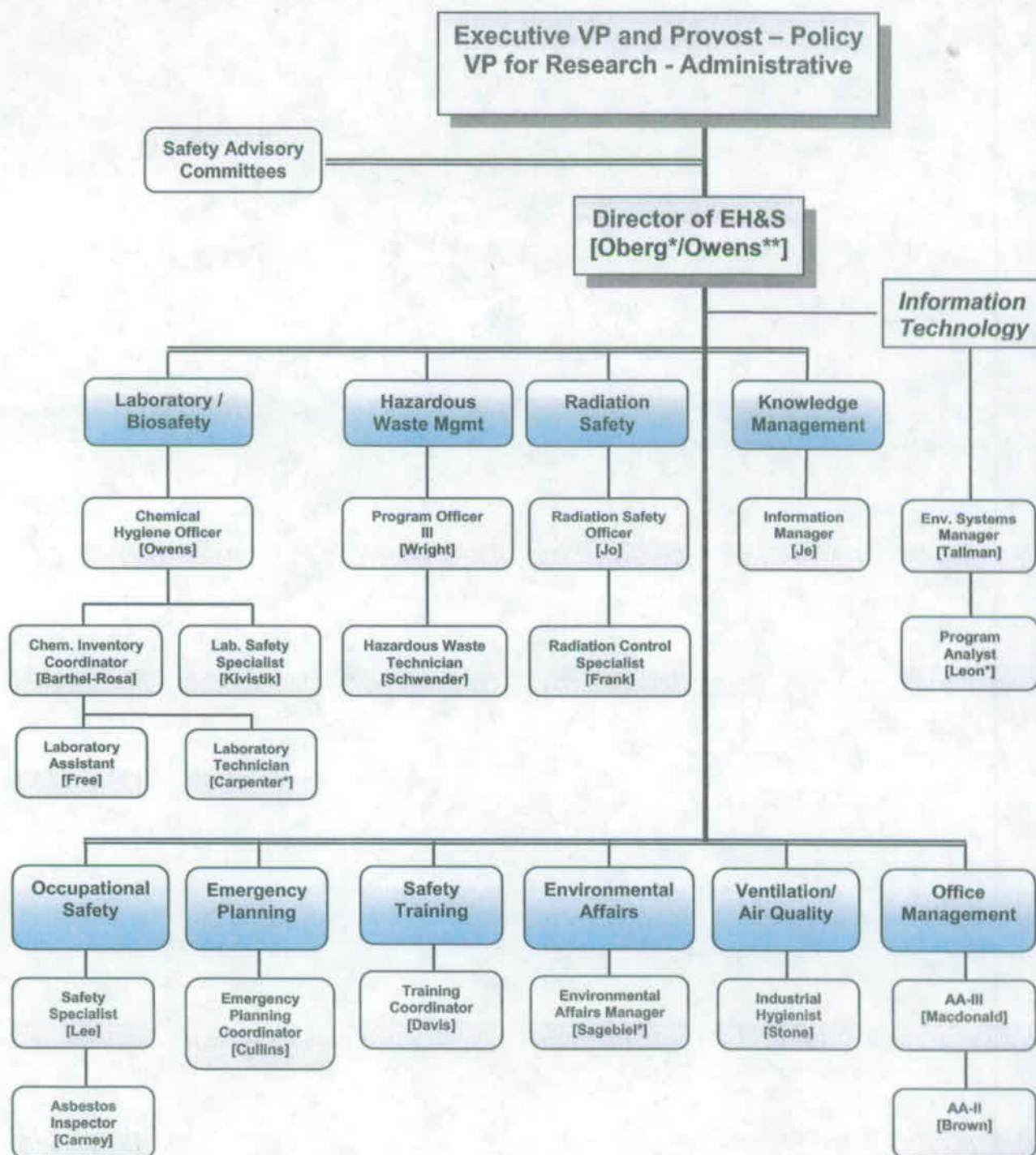
- A Pilot Study to Assess VOCs Emissions and Performance Improvement of a Walk-in Hood Filtration System
- Exposure Reduction Projects
- Irradiator Relocation and Security System Upgrade
- Inventory at Central Receiving

## **App.4 Staff Data**

- Publications
- Presentations and Reviews
- UNR Lectures
- Grants Awarded and Pending
- Professional Awards
- Certifications and Licenses Obtained and Maintained
- Continuing Education
- UNR Governance Committee Assignments
- Professional/Public Service
- Services to Other Institutes of NSHE

## **App. 5 Current Permits and Licenses**

## App. 1 EH&S Organization Chart

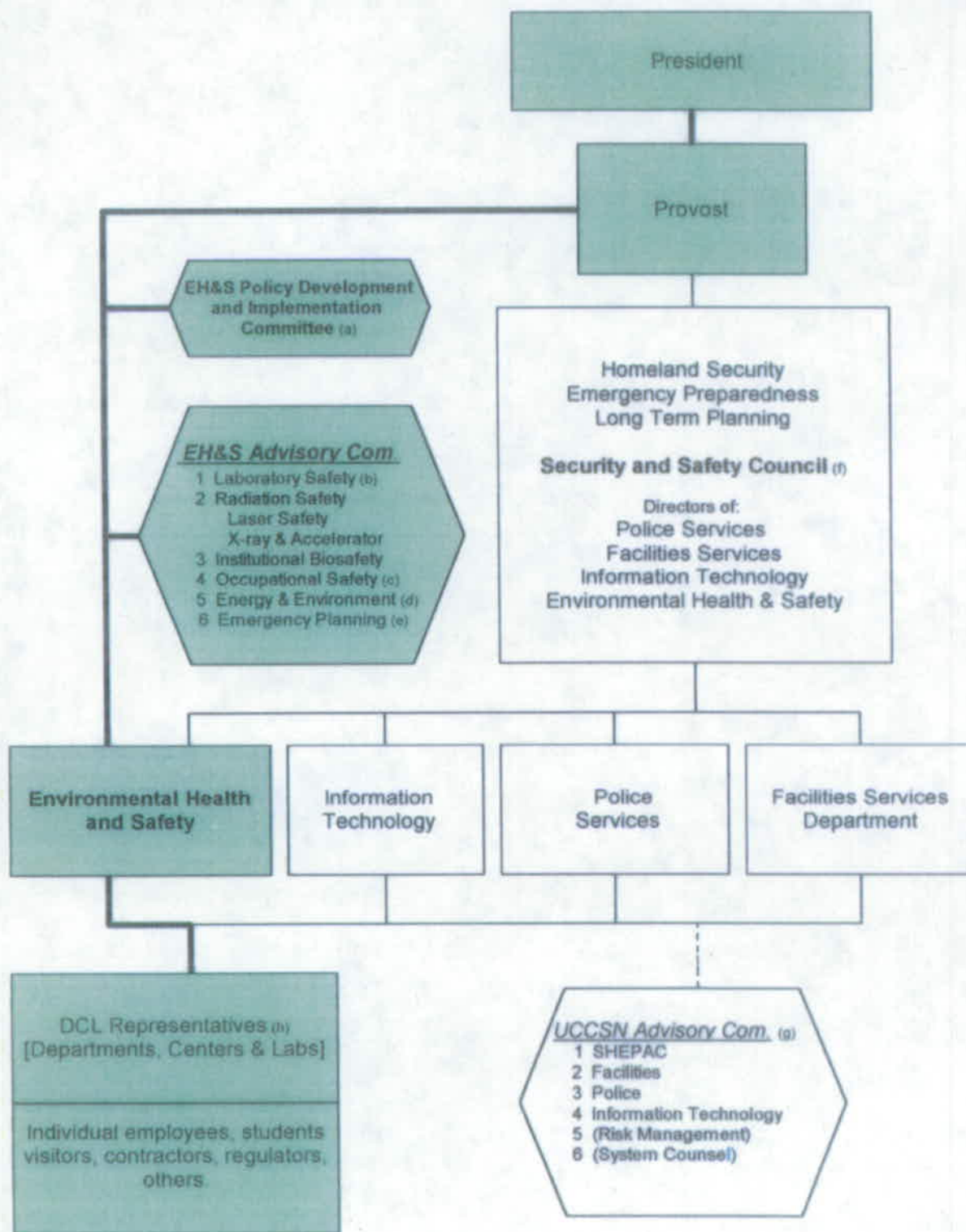


\* partial year

\*\* partial year interim director



## App. 2 Safety Committee Organization Chart



### **Revised system of Environmental Health and Safety advisory and management committees, and establishment of the Security and Safety Council**

(a) The *Policy Development and Implementation Committee* creates EH&S policy and monitors policy effectiveness at UNR. Policy development activities will diminish over time while implementation issues could increase with the number of EH&S policies adopted. The committee is composed of higher level administrators on a rotating basis. Group meetings are intended to be infrequent (once per semester or calendar quarter, or on an as-needed basis). Appointments are made by the Provost and the committee reports to the Provost's office.

(b) The *Laboratory Safety Committee* coordinates all issues specific to laboratory environments. It provides a means to consider chemical issues as well as radiological, biological and physical concerns<sup>1</sup>. Membership consists of chairs or designated representatives of existing specialty committees and also includes research PIs. The LSC is supported by the EH&S Chemical Hygiene Officer.

(c) The *Occupational Safety Committee* derives from the previous University Safety Committee which is now officially dissolved. This revised committee meets OSHA safety committee requirements and focuses on regulatory compliance and workplace safety issues. The OSC is supported by the EH&S Safety Specialist.

(d) The *Energy and Environment Committee* is a new function that guides the efforts of EH&S and other operational units that are affected by discharge permits and pollution prevention requirements, as well as by contemporary resource protection and conservation expectations. The committee recommends actions that lessen the University's impact on the environment while leading to long term cost control. The group determines means to integrate UNR operations with compliance, academic and research activities in meeting the university's agreed upon sustainability targets. The EEC is supported by the EH&S Environmental Affairs Manager.

(e) The *Emergency Planning Advisory Committee* consists of members from operational support departments along with other representatives who may have broader University perspectives. The group concentrates on development of laboratory, department and building emergency plans and recommends means to integrate and optimize respective support unit contributions to overall UNR emergency planning goals. The group facilitates planning and performance of emergency drills at the building level, and will participate in preplanning arrangements with response authorities. The EPAC is supported by the EH&S Emergency Planning Coordinator.

(f) The *Security and Safety Council* provides coordinating and management functions related to matters that have Homeland Security and overall campus emergency planning impacts or interests. The four program directors serve as the focal point for eligible long term planning issues and immediate concerns raised within the support programs themselves, or by the several safety-related advisory committees that exist by law for specialty safety purposes. The overall role of the Council is to facilitate communications among support units, to coordinate certain activities that overlap administrative units, and to advise the Provost. The SSC is supported by Police Services.

(g) The NSHE attempts to assist in the provision of support services that are common to all System campuses. Committees of institutional representatives serve advisory functions for the Chancellor (safety, facility operations, business officers, etc.) Other System-level services (risk management, legal counsel) also influence local campus activities. As appropriate, System services would be formally connected to support departments, safety advisory committees, or the Security and Safety Committee to ensure that exchanges of safety and operational communications are officially acknowledged and properly routed.

**Revised system of Environmental Health and Safety advisory and management committees, and establishment of the Security and Safety Council (continued)**

(h) *Departments, Centers and Lab* representatives facilitate improved communication and liaison among all parties affected by regulatory and management matters considered by service support departments. The DCL representatives may be formally or informally charged by their home units (or groups of similar units) and serve as information exchange conduits between their buildings and the service support departments. The designation of DCLs is intended to be a convenient option for improving communication efficiency, but the management concept would not prevent any employee from conducting routine business directly with any of the service departments.

<sup>1</sup> Institutional Biosafety Committee (IBC) and the Radiation Safety Committee (RSC) functions and assignments are unchanged. The Laboratory Safety Committee does not duplicate or supercede existing radiological or biological control services. Laboratories are basic management units that have multiple characteristics which always include chemical and physical hazards, and may include the use of radioactive materials or biological agents. The LSC will ensure that labs are not assigned redundant or contradictory instructions from the various control agencies involved in lab safety.

**Laboratory Safety**

Thomas Bell, Ph.D. (Chair) Professor, Chemistry Department	Claus Tittiger, Ph.D. Associate Professor, Biochemistry and Molecular Biology Department
William Courchesne, Ph.D. Associate Professor, Microbiology and Immunology Department	Myung Chul Jo Radiation Safety Officer, EH&S Committee Technical Support ( <i>ex officio</i> non-voting)
Alan Fuchs, Ph.D. Associate Professor, Chemical and Metallurgical Engineering Department	Ben Owens Chemical Hygiene/Biosafety Officer, EH&S ( <i>ex officio</i> non-voting)
Ronald Phenauf, Ph.D.* Professor, Physics Department	Mary Macdonald Administrative Assistant III, EH&S (non-voting)
Richard Simmonds, DVM* Director, Lab Animal Medicine	

\*: partial year



## Radiation Safety Committee

Ronald Phaneuf, Ph.D. (Chair)** Professor, Department of Physics	Ron Mittler, Ph.D. Associate Professor, Department of Biochemistry
Iain Buxton, Ph.D. Professor, Department of Pharmacology	Brian Perrino, Ph.D. Associate Professor, Department of Physiology & Cell Biology
Dhanesh Chandra, Ph.D. Professor, Department of Chem. & Met. Engr.	David Schooley, Ph.D. Professor, Department of Biochemistry
Joseph Cline, Ph.D. Associate Professor, Department of Chemistry	Richard Simmonds, DVM (Chair)* Director, Lab Animal Medicine
Carol Condit, Ph.D. Associate Professor, Department of Biochemistry	Janet Vreeland, Ph.D. Vice Provost, Provost Office
Fred Harvey Purchasing	Myung Chul Jo Radiation Safety Officer, EH&S ( <i>ex officio</i> non-voting)
Stephen DEST Jeor, Ph.D. Environmental Affairs Manager, Department of Microbiology	Donna Brown Administrative Assistant II, EH&S (non-voting)
Martha McRae Director, Environmental Health & Safety, DRI	

\*: partial year

\*\*: comm. member full year; partial year as Chair

## Radiation Safety Committee - Accelerator &amp; X-ray Safety Subcommittee

Dhanesh Chandra, Ph.D. (Chair) Professor, Department of Chem. & Met. Engr.	Jeffrey Thompson, Ph.D. Associate Professor, Department of Physics
Vincent Catalano, Ph.D. Associate Professor, Department of Chemistry	Myung Chul Jo Radiation Safety Officer, EH&S ( <i>ex officio</i> non-voting)
Marion Desilets, Ph.D. Staff Research Associate, Nevada Bureau of Mines and Geology	

## Radiation Safety Committee - Laser Safety Subcommittee

Jack Glassman, Ph.D. (Chair) Research Assistant Professor, Department of Physics	Banmali Rawat, Ph.D. Professor, Department of Electrical Engineering
Joseph Cline, Ph.D. Associate Professor, Department of Chemistry	Myung Chul Jo Radiation Safety Officer, EH&S ( <i>ex officio</i> non-voting)
Nelson Publicover, Ph.D. Professor, Department of Electrical Engineering	

## Institutional Biosafety Committee

William Courchesne, Ph.D. (Chair) Associate Professor, Microbiology and Immunology Department	Sha Liao, Ph.D. Community Member, Application Specialist Hamilton Company
John Cushman, Ph.D. Professor, Biochemistry and Molecular Biology Department	Roger Van Andel, DVM, Ph.D.* Director, Laboratory Animal Medicine
Arthur DiSalvo, M.D. Community Member, Nevada State Public Health Laboratory (retired)	Ben Owens Chemical Hygiene/Biosafety Officer, EH&S ( <i>ex officio</i> non-voting)
Kenneth Hunter, Ph.D. Professor, Microbiology and Immunology Department	Mary Macdonald Administrative Assistant III, EH&S (non-voting)

\*: partial year

## Occupational Safety Committee

Richard Simmonds, DVM (Chair)* Director, Lab Animal Medicine	Dean Hummel Fire and Life Safety
Steve Djukanovich, (Chair)** Manager, Workers' Compensation	Marcus Milligan Fleet Management
Ray Bretz B&G Custodial Services	Dana Penrod Parking and Transportation Services
Peter Brown Staff Employees' Council Representative	David Lee Occupational Safety Officer, EH&S ( <i>ex officio</i> non-voting)
Peg Farrar, RN Orvis School of Nursing	Donna Brown Administrative Assistant II, EH&S (non-voting)

\*: partial year

\*\*: comm. member full year; partial year as Chair

## Energy and Environment Committee

Michael Collopy, Ph.D. (Chair) Director, Academy for the Environment	Duane Sikorski Supervisor, Air Quality Monitoring and Planning, Washoe County
Rebecca Bevans Internal VP, GSA	Ron Zurek Vice President, Administration & Finance
Kim Knudson ASUN Representative, College of Science Senator	John C. Sagebiel, Ph.D. Environmental Affairs Manager, EH&S ( <i>ex officio</i> )
Nancy Markee, Ph.D. Director, Academic Advising & Coordinator, Undergraduate Advising	Mary Macdonald Administrative Assistant III, EH&S (non-voting)
Stephen Mischissin, P.E. Assistant Director, Planning & Design, Facilities Services	

## Emergency Planning Advisory Committee

Todd Renwick, (Chair) Associate Director, UPS	Angie Taylor Student Success Services
Peter Brown Staff Employees' Council Representative	Robert Cullins Emergency Coordinator, EH&S ( <i>ex officio</i> non-voting)
Greg Gardella Teaching & Learning Technology	David Lee Occupational Safety Officer, EH&S ( <i>ex officio</i> non-voting)
Joe Greco Facilities Services	Donna Brown Administrative Assistant II, EH&S (non-voting)
Nancy Mead Nevada State Health Laboratory	



## App. 3 Special Projects

### A Pilot Study to Assess VOCs Emissions and Performance Improvement of a Walk-in Hood Filtration System

Airborne emissions of volatile organic compounds (VOCs) from hazardous waste management facilities can be a significant concern on some university campuses. The University of Nevada, Reno (UNR), walk-in hood exhaust filtration system was specifically designed to capture gas streams and particulates generated during chemical bulking operations. The primary objectives of this study were to: 1) investigate the relationships between VOC removal efficiency and various carbon contents of activated carbon filters; and 2) determine optimal operational conditions to further minimize discharge of VOCs.

Pouring hazardous waste chemicals into a container for temporary storage and shipment causes emissions of volatile toxic gases and vapors into the working environment. Engineering controls and personal protective equipment are therefore required to reduce exposure to VOCs in the workplace. The walk-in exhaust filtration system was specifically designed to capture VOC gas streams and particulate matter, thus minimizing emissions to the environment and the potential for human exposure, contamination of the work area, and the possibility of explosive reactions.

The walk-in hood exhaust filtration system is located in the UNR hazardous waste management facility. The overall schematic of the adsorption system is illustrated in Figure App.3-1. The system consists of a flexibly designed rack containing parallel pre-filters to remove dust and dirt, activated carbon for adsorption of organic vapors, pressure and air velocity gauges, an exhaust fan, a data acquisition and visualization system, and weather-measuring equipment. The exhaust fan was selected and optimized to maintain a minimum hood face velocity of 80 fpm. Pressure gauges are externally mounted to monitor static pressure differentials between the

pre-filter and the post-filter. Activated carbon filters are used for the removal of VOCs and odors because adsorption on activated carbon is a relatively simple, reliable and economical approach for removing organic compounds. Generally, organic compounds with a high molecular weight and boiling point are effectively adsorbed by activated carbon.

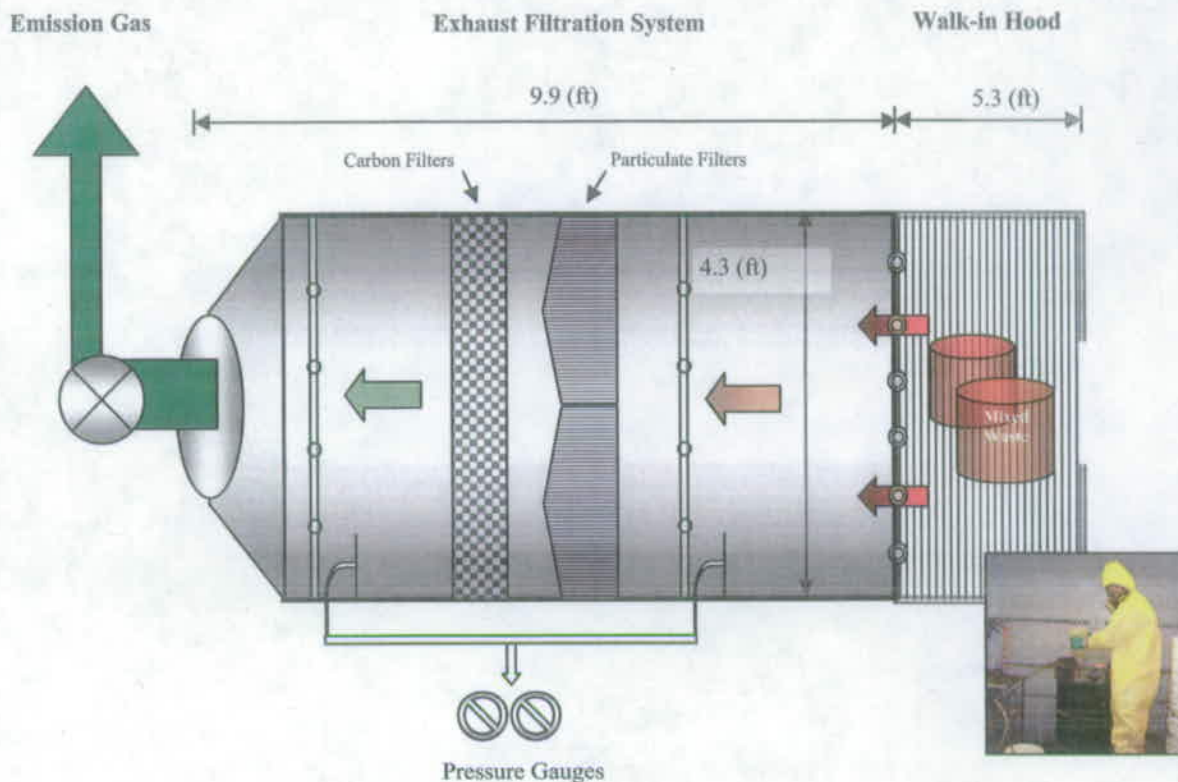
Gas samples are drawn through a cross-sectional sampling tube placed inside the hood and enter photo-ionization (PID) sensors for gas analysis at a pump flow rate of 6.5cc/min. PIDs for sampling and analysis are installed at 5 different locations (fore, and aft of filtration assemblies, hood, room, and stack). Each sampling location is selected to characterize a gas stream for the following purposes:

- Room: ambient room atmosphere during pouring operations, workers in level C PPE (personal protective equipment)
- Hood: worker exposure during pouring operations, workers in level C PPE (personal protective equipment)
- Pre filter: highest concentration – focused air stream
- Post filter: following treatment for VOC removal
- Stack: concentration at last point of control, actual environment release

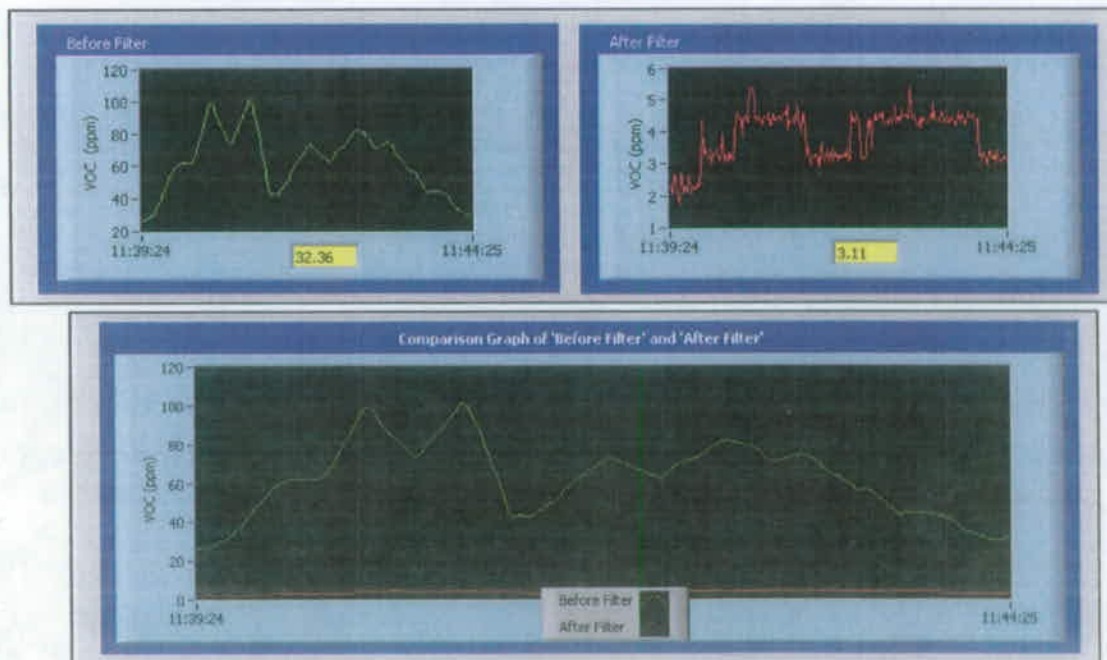
Before running the monitoring system, PID sensors are calibrated with zero gas and standard reference gas such as isobutylene. Measurements are collected at a rate of 100 samples per second and averaged every second.

Four experimental tests were conducted using pure acetone to allow a comparison of adsorption efficiencies of filters with different activated carbon (AC) contents. Before each run, a new set of activated carbon filters was installed. Gas streams were generated by gently boiling a 4L beaker of acetone over a temperature-controlled heater inside the hood.

**Figure App.3-1** Schematic of Walk-in Hood Exhaust Filtration



**Figure App.3-2** Real Time VOC Reduction Results from Data Collection



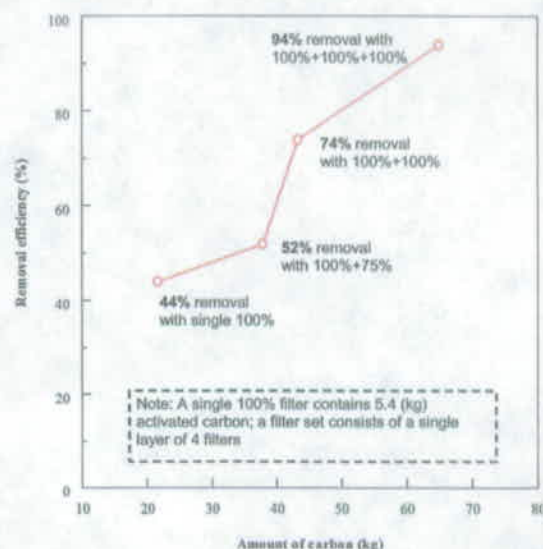
For each run, pressure drop, air velocity change, and face velocity were measured. Average face velocities were at or above the minimum face velocity of 80 fpm. Concentration changes between pre and post filters were also recorded and analyzed to calculate the overall removal efficiency of carbon filters. Figure App.3-2 illustrates real-time VOC level changes with three 100% filter sets installed. The results are summarized in Table App.3-1.

Figure App.3-3 shows a comparison of adsorption efficiency with different activated carbon contents. It was found that combining three layers of 100% filter sets (carbon volume) provided the best removal efficiency of 94% under test conditions. Combining two layers of 100% filter sets showed the second best result of 74%. As expected, a single 100% carbon filter set showed the lowest removal efficiency of 44%. Our results indicate that three 100% carbon filter sets (12 filters, 65 kg activated carbon) provided effective VOC removal, disregarding cost. More research will be conducted to assess cost and optimum operation associated with VOC treatment.

**Table App.3-1** Ventilation and Removal Efficiency Results for Various Filter Configurations

Carbon Content (%)	Face Velocity (fpm)	Pressure Drop (in H <sub>2</sub> O)	Removal Efficiency (%)
Single 100%	94	0.314	44
100% + 75%	90	0.342	52
100% + 100%	85	0.395	74
100%+100%+100%	80	0.498	94

**Figure App.3-3** Real Time VOC Reduction Results from Data Collection System



### Exposure Reduction Projects

Previous exposure assessments in the Nevada State Health Laboratory histology lab indicated average airborne xylene exposures of 20-30 ppm with peaks in excess of 740 ppm during tissue processor fluid change out. Numerous complaints of objectionable odor from occupants in adjacent areas were also received. As a result, recommendations were provided by EH&S for installation of a new tissue processor which included provisions for connection to a ventilation system. Additionally, recommendations were provided to install a new laboratory hood which could more effectively house and contain volatile emissions from histology activities. Additional exposure assessment was then conducted to characterize effectiveness of these recommendations. Exposures to xylene during processor solvent change operations were reduced to an average of 3-6 ppm with peaks of approximately 30 ppm. This indicated that these improvements resulted in a significant reduction in exposure well below acceptable occupational exposure limits.

Previous exposure assessment during sculpture classes in Church Fine Arts indicated



dust exposures approaching the occupational exposure limit of  $1 \text{ mg/m}^3$ , expressed as an eight-hour time weighted average. Based on EH&S recommendations, a new dust collection system was installed which reduced dust exposures approximately three fold.

### **Irradiator Relocation and Security System Upgrade**

The irradiator was moved to a new location. To minimize irradiator down time and to coincide with the new room construction the RSP coordinated the move among irradiator users, a licensed mover and a new facility construction group. The licensed mover was from Southern California. The 1,400 lbs of equipment that was used to move the irradiator had to arrive prior to the scheduled irradiator move. The move schedule was changed several times and delayed eight months because of construction delays. The move was ultimately successful resulting in a minimal amount of irradiator down time (2 days).

The State Department of Radiological Health required UNR to add security to the gamma irradiator on the UNR campus. The irradiator security system has been upgraded to meet the new requirements. The order originated from the Department of Homeland Security through the US Nuclear Regulatory Commission. The regulatory implementation date was April 2006, but it was negotiated with the regulators to extend the implementation date to August 2006 because of the planned move of the gamma irradiator to the new location which was to be completed in April 2006. The new security requirement included background checks of irradiator users (employment history, education, and personal references). This was coordinated with the various Human Resources (HR) Departments for their assistance in gathering information regarding the users' backgrounds. The licensee required a documented plan to monitor and immediately detect, assess, and respond to, unauthorized access to the gamma irradiator. The requirements also included having a documented prearranged response plan with the local law enforcement agency. Added

safety devices included an area radiation monitor which shuts down the irradiator if external radiation levels exceed two mR/hr.

### **Inventory at Central Receiving**



In December 2005, the Washoe County Health District issued a notice of violation for failure to report chemical throughput on the air discharge permit. As a response, UNR administration required all campus personnel to use an electronic purchasing program (SciQuest) for all chemical purchases, effective February 1, 2006. By mid 2006, however, an investigation of credit card purchases revealed that many chemicals were not being purchased through SciQuest, despite the mandate. A detailed examination of the quality of data being supplied from SciQuest showed it was missing key elements, such as CAS numbers and number of individual containers per case ordered. The chemical names in SciQuest were also often combined with quantity and unit of measurements in one data field, precluding any automatic electronic aggregation. Campus users also complained about the complexity of the software and lack of supplier choices available.

A meeting between higher administration and EH&S was held in July to identify alternative means of tracking chemical throughput. EH&S submitted a proposal that would track all chemicals from "cradle to grave." The proposal included intercepting and inventorying all chemicals delivered to the campus at the Central Services building, delivery of chemicals directly to the final labs of use (instead of administrative offices), and removal and disposal of empty containers from



laboratories. Because of the need to track incoming chemicals as soon as possible for the December AQMD report, and the complexity of delivery and empty container pick up, only the central receiving inventory part of the proposal was approved and funded. During the initial phase-in, EH&S has not delivered the chemicals to the final lab location, but has instead returned them to Central Services staff for delivery to mail stops. The full proposal will be reviewed again in 2007 after completion of the 2006 air emissions report with feedback from the County Health District.

On August 1, 2006, EH&S hired a full time temporary emergency hire on a three month contract to perform inventory at Central Services and in-lab inventory. Observations were made at Central Services and it was found that packages are usually delivered between 8:45am and 10:00 am daily and Central Services staff start their delivery runs by 10:30 – 10:45 am. Bulk shipments and items sent by freight often arrive in the afternoon and are delivered the next day. A minimum of two staff EH&S staff members are needed every morning to identify and sort through the large volume of boxes delivered to the campus. EH&S must return to Central Services late every day to check for afternoon deliveries.



On August 14, EH&S started “practice” inventory at Central Services to learn the process flow and to develop procedures, but no packages were withheld for inventory reasons. The Provost and VPR sent out an email to the campus announcing the inventory program, which officially started on August 21<sup>st</sup>. An

explanatory letter, along with detailed FAQ's were placed in every opened box and were posted on the EH&S web site.

The general procedures for inventory at Central Services are as follows:

- All incoming packages are visually examined as possibly containing chemicals.
- Items destined for science and engineering departments are given more scrutiny.
- If an item is suspected to contain a chemical, the packing slip is opened to verify.
- If a packing slip is not available, the box must be opened to check for chemicals.
- Opened boxes that do not contain chemicals are immediately returned to Central Services for normal delivery.
- Items that are found to contain chemicals are set aside for inventory after all the primary shippers (UPS, DHL and FedEx) have delivered their loads.
- Boxes marked “express” or “same day delivery” are inventoried first to ensure they are delivered on the day of arrival.
- Items marked “ground” are inventoried after all the express items are inventoried.
- Items shipped on dry ice are not handled by EH&S.
- Items shipped on cold pack or “blue ice” are sometimes inventoried depending on the contents.
- All chemicals are unpacked, inventoried, bar coded, and re-packed in their original packaging.
- Some chemicals are packed inside metal cans to protect the contents. The metal cans are not opened by EH&S but items are inventoried.
- Inventoried items are returned to Central Services for final delivery to mail stops.
- Any irregularities found with containers, such as evidence of leaking or damage are documented (photographed) and reported to the end user immediately.

EH&S collected daily statistics at Central Services from August 2006 through March 2007 and the results are shown in Table App.3-2.



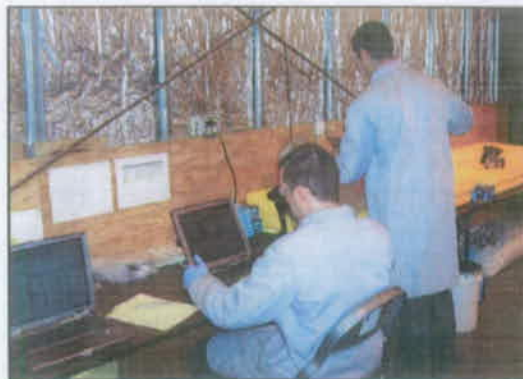
**Table App.3-2** Central Services Inventory Results

	Total Packages Received	Packages with Chemicals	Individual Chemicals Inventoried
Average per day	356	15	36
Maximum in one day	640	39	306
Minimum in one day	140	4	4
Total in 2006 (Aug. – Dec.)	30,534	1,279	3,282

On average, UNR received about 350 packages per day. Some packages are externally marked such that it is obvious they don't contain chemicals (computers or office supplies for example) and don't require any extra handling. Some packages are clearly marked with hazardous material shipping stickers and are readily identified as chemicals. However, some items do not have any external distinguishing marks and must be scrutinized by EH&S staff. Between 80 and 100 items per day must be closely examined or have the packing slip opened to determine the contents. On average, EH&S inventories about 36 chemicals per day. The days with the largest number of chemicals have been the result of large shipments of chemicals to ChemStores, which supplies common chemicals for the entire campus.

Between August 21 and December 22, the total number of packages containing chemicals was 1,279 and the total number of chemicals inventoried was 3,282. The number of chemicals inventoried is expected to be higher than the number of packages received as some packages contain multiple chemical containers. Central Receiving is included in the UNR winter campus closure and was closed from Dec. 25 – 29<sup>th</sup>. The data used to generate Table App.3-2 is graphically displayed in Figure App.3-4 from August 21st – December 22nd, the last working day of the calendar year. The data for total packages received are supplied by Central Services staff. Every package is at least visually examined by EH&S. The packages requiring hands-on examination are those that must be handled and carefully examined (shipped from,

destination, supplier, etc.) to ascertain if the contents contain chemicals. The number of chemicals inventoried is relatively steady with occasional spikes, usually resulting from a large shipment to ChemStores. The number of chemicals inventoried tends to be above average after state holidays as well.



On September 6, 2006, EH&S presented a status report of the Central Services inventory and comparison to SciQuest e-purchasing activity. It was found that 27% of all the chemicals being delivered to campus were not being ordered through SciQuest over a three week period of time.

On November 1, 2006, the temporary hire was made permanent (a new classified position in EH&S). The position will be cross-trained to conduct inventory at Central Services, physical in-lab inventory, and waste pickups to integrate staff responsibilities.

On December 5, 2006, representatives from Washoe County Health District conducted an unannounced visual inspection/observation of chemicals being inventoried at Central Services. The inspectors found UNR to be in compliance with all tracking throughput requirements.

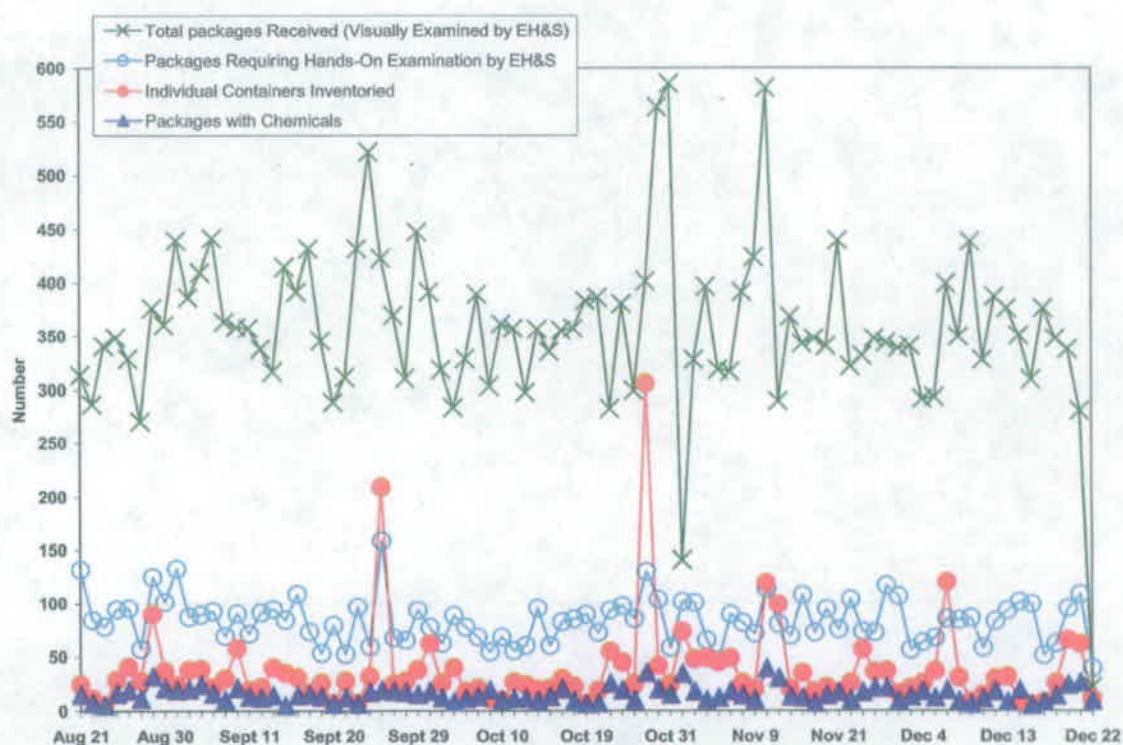
Since August 21, 2006, EH&S documented 8 to 10 incidents of containers shipped to UNR with cracked lids, damaged containers or evidence of leaking during the shipping process. On two occasions, the exterior chemical box labeling did not match the item actually packed inside the box. The recipients were contacted via e-mail with supporting photographs of the items in the condition found. In some cases, the



recipients were able to contact the suppliers and have replacement items re-shipped.

Overall, the initial phase of inventory at Central Services went very well. Expansion of the program to include EH&S delivery of chemicals directly to final labs and empty container pick-up is expected sometime in 2007.

**Figure App.3-4** Daily Package and Inventory Activity at Central Services



## App. 4 Staff Data

### Publications

- Je, C.H., D. Hayes, and K.S. Kim, "Predicting a Toxic Plume Caused by Environmental Dredging for Remediation of Contaminated Sediments", Chemosphere, Submitted for Publication, 2006.
- Je, C.H., R. Stone, and S.G. Oberg, "Development and Application of a Multi-channel Monitoring System for Near Real-time VOC Measurement in a Hazardous Waste Management Facility", Science of the Total Environment, Submitted for Publication, 2006.
- Je, C.H., R. Stone, and S.G. Oberg, "Smart Multi-channel Monitoring System for Real-time Hazardous Gas Measurement," Proceeding of Global Convention of Ethnic Korean Scientists and Engineers (GCSE), Seoul, Korea, 2006.

### Presentations and Reviews

- Barthel-Rosa, L.P. "UNR Chemical Inventory Update 2006" Nevada System of Higher Education (NSHE) Safety Health and Environmental Advisory Committee (SHEPAC) Quarterly Meeting, Reno, NV, March 16, 2006.
- Barthel-Rosa, L.P. "UNR Chemical Inventory Update 2006" Special Technical Inventory Exchange Meeting between UNR and UNLV at the Request of NSHE Risk Management, Reno, NV, May 3, 2006.
- Barthel-Rosa, Luis P., "Mass-Balance Calculations Performed to Estimate Airborne Emissions of HAPs and VOCs from University Laboratory Fume Hoods: A Case Study", The 61<sup>st</sup> Northwest Regional Meeting of the American Chemical Society, Sparks, NV, Monday June 26, 2006.
- Barthel-Rosa, Luis P., "Mass-Balance Calculations Performed to Estimate Airborne Emissions of HAPs and VOCs from University Laboratory Fume Hoods: A Case Study", Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA July 17, 2006.
- Cullins, R.H., Presentation to the Board of Regents of the Nevada System of Higher Education regarding the Pandemic Influenza Plan for the University of Nevada, Reno on October 12, 2006.
- Cullins, R.H., Presentation on UNR Pandemic Influenza Plan to the Safety, Health & Environmental Planning Advisory Committee of the Nevada System of Higher Education. November 1, 2006.
- Davis, J. L., Presentation of Professional Development Program "How to Conduct Productive Meetings" to 2 Groups, 2006.

**Presentations and Reviews (continued)**

- Davis, J. L., Speaker to McNair Scholars on November 3, 2006.
- Free, M.J., "Field Challenges of Chemical Inventory Management", Poster Presentation, Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 17-19, 2006.
- Je, C.H., R. Stone, and S.G. Oberg, "A Pilot Study to Assess VOC Emissions and Performance Improvement of a Walk-in Hood Filtration System", Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 2006.
- Je, C.H., "Sensor Technology Application for Real-time VOC Monitoring", Kunsan National University, Korea, July 2006.
- Jo, M.C., "Assessment and Mitigation of Laser Hazards in a University Laboratory Setting", Health Physics Society 2006 meeting, Providence, RI, June 25-29, 2006.
- Kivistik P.M., "Reduction of Risk in the Chemical Laboratory", California Water Environment Association (CWEA) Conference, Sparks, NV, 2006.
- Owens, B. G., "Development and Implementation of a University Select Agent Program", Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 17, 2006.
- Owens, B. G., "A Campus-Wide Evaluation of Peroxide-Forming Chemicals", poster presentation, Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 15-19, 2006.
- Sagebiel, J.C., "Performance assessment of photovoltaic installations", Invited Paper. American Chemical Society Northwest Regional Meeting, Sparks NV June 25-28, 2006.
- Sagebiel, J.C., "Intangible Benefits of Building Green", Presentation at the Governor's High Performance Building Summit. August 31, 2006.
- Sagebiel, J.C., "The Process of Science, The Power of Process, The Strength of Failure", Invited Talk at the Windstar Foundation's Symposium "New Choices for Your Future 2006." Snowmass, CO, October 2, 2006.
- Stone, R., "Anatomy Laboratory Exposure Controls", Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 15-19, 2006.
- Stone, R., "Anatomy Laboratory Exposure Controls", University of Texas System Risk Management Conference, Texas, 2006.



#### **UNR Lectures**

- Kivistik, P. M., Invited lecturer on health physics in NRES 432/632, Advanced Environmental Toxicology (Prof. Glenn Miller), Fall Semester 2006.

#### **Grants Awarded and Pending**

- Collopy, M. and Sagebiel, J.C., Low Impact Development (LID) Demonstration and Storm Water Retention for the New Student Union at UNR. Truckee River Fund. \$50,000.

#### **Professional Awards**

- Davis, J.L., Toastmasters International – Competent Leader
- Davis, J.L., Advanced Toastmaster Gold (ATM-G)
- Davis, J.L., Certificate of Appreciation for Services as VP Membership of Toastmasters Club
- Je, C.H., Listed in Marquis Who'sWho in America
- Je, C.H., Listed in Marquis Who'sWho in Science and Engineering
- Sagebiel, J.C., Nevada Renewable Energy and Energy Conservation Task Force – Renewable Energy And Conservation Honors (REACH) Award.

#### **Certifications and Licenses Obtained or Maintained**

Carney, K.L.

- Licensed Asbestos Abatement Consultant, State of Nevada, Department of Business and Industry, Division of Industrial Relations, Occupational Safety and Health Enforcement Section

Cullins, R.H.

- Certified Emergency Manager (CEM), International Association of Emergency Managers

Davis, J.L.

- Langevine Learning Systems Professional Master Trainer
- American Heart Association Adult CPR/AED
- Nevada Department of Public Safety Child Safety Seat Technician
- Nevada Elementary Traffic Safety Program Instructor
- Silver State Fair Housing Council Housing Discrimination Investigator

**Certifications and Licenses Obtained and Maintained (continued)**

Je, C.H.

- National Council of Examiners for Engineering and Surveying (NCEES), Professional Engineer (P.E.) license in Environmental Engineering

Jo, M.C.

- American Board of Health Physics, Certified Health Physicist (CHP)
- Board of Laser Safety, Certified Laser Safety Officer (LSO)

Kivistik, P.M.

- National Registry of Certified Chemists, Certified Chemical Hygiene Officer (CCHO)

Lee, D.D.

- American Board of Industrial Hygiene, Certified Industrial Hygienist (CIH)
- Board of Certified Safety Professionals, Certified Safety Professional (CSP)

Owens, B.G.

- American Board of Industrial Hygiene, Certified Industrial Hygienist (CIH)
- National Registry of Certified Chemists, Certified Chemical Hygiene Officer (CCHO)

Stone, R.C.

- American Board of Industrial Hygiene, Certified Industrial Hygienist (CIH)
- Board of Certified Safety Professionals, Certified Safety Professional (CSP)

**Continuing Education**

- Barthel-Rosa, L.P. Attended Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 15-19, 2006.
- Barthel-Rosa, L.P. Attended American Chemical Society 61<sup>st</sup> Northwest Regional Meeting, Reno, NV, June 25-28, 2006.
- Cullins, R.H., Completed two (2) on-line training courses on Continuity of Operations sponsored by FEMA's Emergency Management Institute of the National Emergency Training Center. January 2006.
- Cullins, R.H., Attended Post Earthquake Safety Evaluation of Buildings training. April 25, 2006.
- Cullins, R.H., Attended "Local Pandemic Influenza Planning: What Community Leaders Need to Know" seminar conducted by the Washoe County District Health Dept. May 9, 2006.
- Cullins, R.H., Attended Agro-Terrorism workshop conducted in Reno by the University of California, Davis. July 12, 2006.
- Cullins, R.H., Attended Soft Targets Awareness course conducted at the Washoe County Regional Operations Center. September 29, 2006.

### **Continuing Education (continued)**

- Davis, J.L., Attended "2006 Nevada Bicycle and Pedestrian Conference" at Lake Tahoe Sponsored by NDOT, Nevada Office of Traffic Safety, and Nevada Bicycle Advisory Board, April 27-28, 2006.
- Davis, J.L., Trained as NHTSA – National Child Passenger Safety Program Technician Course, October 27-29, 2006.
- Free, M. J., Attended Campus Safety Health and Environmental Management Association (CSHEMA) National Conference, Anaheim, CA, July 15-19, 2006.
- Je, C.H., Participated in technical workshop regarding real-time measurement and control solution, National Instrument, Reno, NV, December, 2006.
- Jo, M., Laser Safety Seminar, August 3-5, 2005, Lawrence Livermore National Laboratory, Livermore, CA, 2006.
- Jo, M., Domestic and International Radioactive Materials Transportation, March 3-4, April 8, 2005, Las Vegas, NV, 2006.
- Kivistik, P.M., American Biological Safety Association (ABSA) / CDC Conference on Animal Safety Issues, Atlanta, GA, January 19-24, 2006.
- Owens, B.G., Completed Professional Development Seminar, "EH&S Management Academy", CSHEMA National Conference, Anaheim, CA, July 15 and 16, 2006.
- Owens, B.G., Continued Progress toward a Ph.D. in Environmental Sciences and Health.
- Stone, R.C., Completed Professional Development Seminar, "EH&S Management Academy", CSHEMA National Conference, Anaheim, CA, July 15-16, 2006.
- Stone, R.C., Continued Progress toward a Ph.D. in Environmental Sciences and Health.

### **UNR Governance Committee Assignments**

Brown, D.F.

- Facilities Resource Committee

Cullins, R.H.

- Emergency Planning Advisory Committee
- Disabilities Resources Coalition
- Washoe County Local Emergency Planning Committee (LEPC)
- Serve on Three National Committees (Program Committee; Training & Education Committee; and Special Needs Populations Committee) of the International Association of Emergency Managers (IAEM)



### UNR Governance Committee Assignments (continued)

Davis, J.D.

- Bylaws and Code Committee
- Administrative Faculty Personnel Policies & Procedures Committee
- Administrative Faculty Evaluation Process Task Force
- Professional Training and Development Taskforce
- Alliance of Racial Minorities
- Occupational Safety Committee Support
- SHEPAC Support

Je, C.H.

- International Activity Committee
- Young Generation Forum Committee (KSEA)

Jo, M.C.

- Radiation Safety Committee
- Lab Safety Committee
- Laser Safety Committee
- X-ray and Accelerator Committee

Kivistik, P. M.

- Institutional Animal Care and Use Committee (IACUC)

Lee, D.D

- Occupational Safety Committee
- Sierra Nevada Job Corps Safety Committee

Oberg, S.G.

- Crisis Action Team
- Emergency Operations Center, Unit Leader
- Safety, Health & Env. Policy Advisory Committee (NSHE)
- Sustainable Design & Renewable Energy Steering Committee (NSHE)

Owens, B.G.

- Institutional Biosafety Committee
- Laboratory Safety Committee
- Position Search Committee – Environmental Affairs Manager (EH&S)
- Position Search Committee – Programmer/Analyst II (Information Technology)
- UNR Video Camera Use Committee

Wright, D.G.

- UNR Police Advisory Committee (PAC)
- UNR Police Review Board
- Washoe County Local Emergency Planning Committee
- Emergency Operations Center, Unit Leader

### Professional/Public Service

Barthel-Rosa, L.P.

- Served as Chair-Elect for the Sierra Nevada Section of the American Chemical Society, January 1, 2006 – December 31, 2006.
- Session Coordinator (Chemical/Hazardous Materials Management) for American Chemical Society Northwest Regional Meeting, Reno, NV, June 26, 2006.

Cullins, R.H.

- Member of the Service Delivery Committee of the Sierra Nevada Chapter of the American Red Cross
- Member of the Pandemic Influenza Coordinating Committee of the Washoe County District Health Department
- Appointed to represent the University of Nevada, Reno on the Nevada Statewide Evacuation Planning Task Force

Davis, J.L.

- GSA Awards Program Judge
- Coordinator for EH&S Jim Randolph Memorial Scholarship
- Assistant Division Governor for Education and Training - Toastmasters Int.
- Kiwani's Member and Contributor to Several Community Service Programs

Je, Chung

- Served as a Member of IAC (International Activity Committee)
- Served as a Journal Reviewer in the Area of Environmental Science and Engineering

Jo, M.C.

- Member Radiological Assistance Team of US DOE
- Professional Membership:  
Health Physics Society  
Sierra Nevada Chapter of Health Physics Society  
Laser Institute of America  
Bay Area Laser Safety Officers

Kivistik, P.M.

- Member, American Biological Safety Association
- Served on editorial board of *Applied Biosafety* (publication of the American Biological Safety Association)
- Served on Local Arrangements Committee of the American Biological Safety Association for the National Conference to be held in 2008 in Reno, NV

Owens, B.G.

- Session Coordinator (Reproductive Health) for American Chemical Society Northwest Regional Meeting, Reno, NV, June 26, 2006.

### **Service to Other Institutions of NSHE**

Barthel-Rosa, L.P.

- Spent One ½ Day with DRI Staff on Methods of Acquiring Inventory and ChemTracker Usage and Training, November 7, 2006.

Jo, M.C.

- Continual Support: DRI North and South Campuses, All Services Related to Radioactive Materials Use from Procurement to Disposal
- Continual Support: DRI North, All Services Related to DRI's X-ray Machines, Annual Registration with the State and Annual X-ray Surveys
- Continual Support: DRI North and South, All Services Related to Sealed Radioactive Sources are also provided, Bi-annual Leak Test of Sealed Sources, Quarterly Inventory, and Radioactive Materials Transportation Assistance
- Continual Support: DRI North, Laser Worker Training
- Great Basin College Support: Radiation Survey Meter Calibration, Shielding Consultation

Owens, B.G.

- Position Search Committee - TMCC EH&S/Emergency Response Coordinator



## App. 5 Current Permits and Licenses

### Centers for Disease Control (CDC) and Prevention Select Agent Registration Program

- Southern Nevada Public State Health Laboratory (SNPHL), Las Vegas, NV
- Nevada Public State Health Laboratory (NPSHL), Reno, NV

### Environmental Protection Agency

- EPA, Large Quantity Generator, ID# NVD 981 963 549

### Washoe County District Health Department - Air Quality Management Division (WCAQMD)

- B01933A – Central Heat Plant
- A02-0069 – Internal Combustion Generators
- A04-0001 – Large Animal Carcass Incinerator
- B01487A – Laboratory Hoods

### Conditional Dust Control permits from WCAQMD for each construction project

- ID# 36047 – West Stadium Parking Garage-TW Construction/TNT Construction
- Redfield Campus – Clark & Sullivan Construction
- D04050 – Manogue site demolition-TW Construction
- D04062 – Manogue site fill-TW Construction

Storm Water Pollution Prevention Plan for all construction projects are permitted through the Nevada Division of Environmental Protection (NDEP) and are covered under the General Permit #NVR100000.

### National Pollutant Discharge Elimination System (NPDES) limits as administered through Reno Municipal Code, Section 12.16.580, Limitations on Wastewater Strength

- 887783-01-04 – Fleischman Agriculture
- 887783-01-09 – Laxalt Mineral Research Center
- 887783-01-03 – Laxalt Mineral Engineering
- 887783-01-13 – Harry Reid Engineering Laboratory
- 887783-01-02 – Chemistry Building
- 887783-01-01 – Medical School
- 887783-01-16 – Applied Research Facility
- 881882-01-01 – Nevada State Health Laboratory
- 887783-01-07 – Jot Travis Student Union
- 887783-01-10 – Church Fine Arts
- 887783-01-12 – Maintenance Building #69(Twilight)
- 887783-01-11 – B&G Maintenance Building (Evans)
- 887783-01-08 – Scrugham Engineering
- 887783-01-05 – Leifson Physics

Nevada Division of Environmental Protection Effluent Use Permit for Nevada Agricultural Experiment Station #NEV92012

**(App. 7 continued)**

Washoe County District Health Department issues Waste Release Permits for the following Sand/Oil Separators

- H041091 – Greenhouse Tank (Record St)
- H041137 – Central Heat Plant
- H041128 – Small Engine Wash Down (Twilight)
- H041133 – Agriculture Mechanics (Valley)
- H041129 – Garage Tank (Twilight)
- H041131 – Garbage Dump (Twilight)
- H041132 – Church Fine Arts Tank

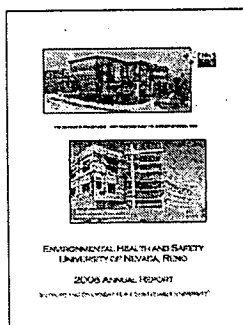
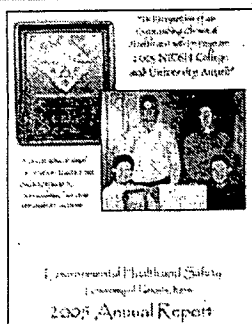
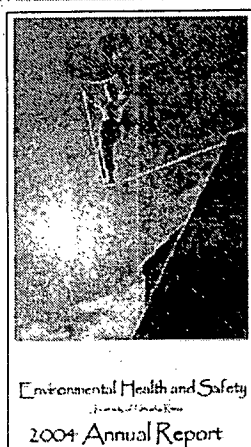
State of Nevada, Department of Human Resources, Health Division

- Radioactive Material License, #16-17-003-07
- Accelerator Licenses (4)
- Various X-ray Unit Licenses (28)

Radioactive Waste Permit, Washington State

Radioactive Waste Permit, UNR-05-01, Rocky Mountain Board

June 18, 2007


**University of Nevada, Reno**  
*Stardom. Worldwide.*
**2006 COVER PAGE****2005 COVER PAGE****2004 COVER PAGE**
[Misc](#) | [Annual Report](#)
**EH&S ANNUAL REPORTS**

## 2004-2006 Annual Environmental Health & Safety Report

University of Nevada, Reno

Disclaimer: Use the Adobe Acrobat® Reader to view PDF files.

**EH&S Annual Report is distributed as a reference for those interested in Environmental Health & Safety activities, or environmental aspects of university operations.**

**2006 ANNUAL REPORT**

Title	Created Date	Description	
<a href="#">Full Report in One PDF</a>	3/26/2007	PDF	<a href="#">Download</a>
<a href="#">Table of Contents for Report</a>	3/26/2007	PDF	<a href="#">Download</a>
<a href="#">Preface for Report</a>	3/26/2007	PDF	<a href="#">Download</a>
<a href="#">Section A for Report</a>	3/26/2007	PDF	<a href="#">Download</a>
<a href="#">Section B for Report</a>	3/26/2007	PDF	<a href="#">Download</a>
<a href="#">Report Appendices</a>	3/26/2007	PDF	<a href="#">Download</a>

**2005 ANNUAL REPORT**

Title	Created Date	Description	
<a href="#">Full Report in One File</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Preface for Report</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Table of Contents for Report</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Section A for Report</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Section B for Report</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Report Appendices</a>	9/21/2006	PDF	<a href="#">Download</a>

**2004 ANNUAL REPORT**

Title	Created Date	Description	
<a href="#">Full Report in One File</a>	10/3/2006	PDF	<a href="#">Download</a>
<a href="#">Preface for Report</a>	10/3/2006	PDF	<a href="#">Download</a>
<a href="#">Table of Contents for Report</a>	10/3/2006	PDF	<a href="#">Download</a>
<a href="#">Section A for Report</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Section B for Report</a>	9/21/2006	PDF	<a href="#">Download</a>
<a href="#">Report Appendices</a>	9/21/2006	PDF	<a href="#">Download</a>



